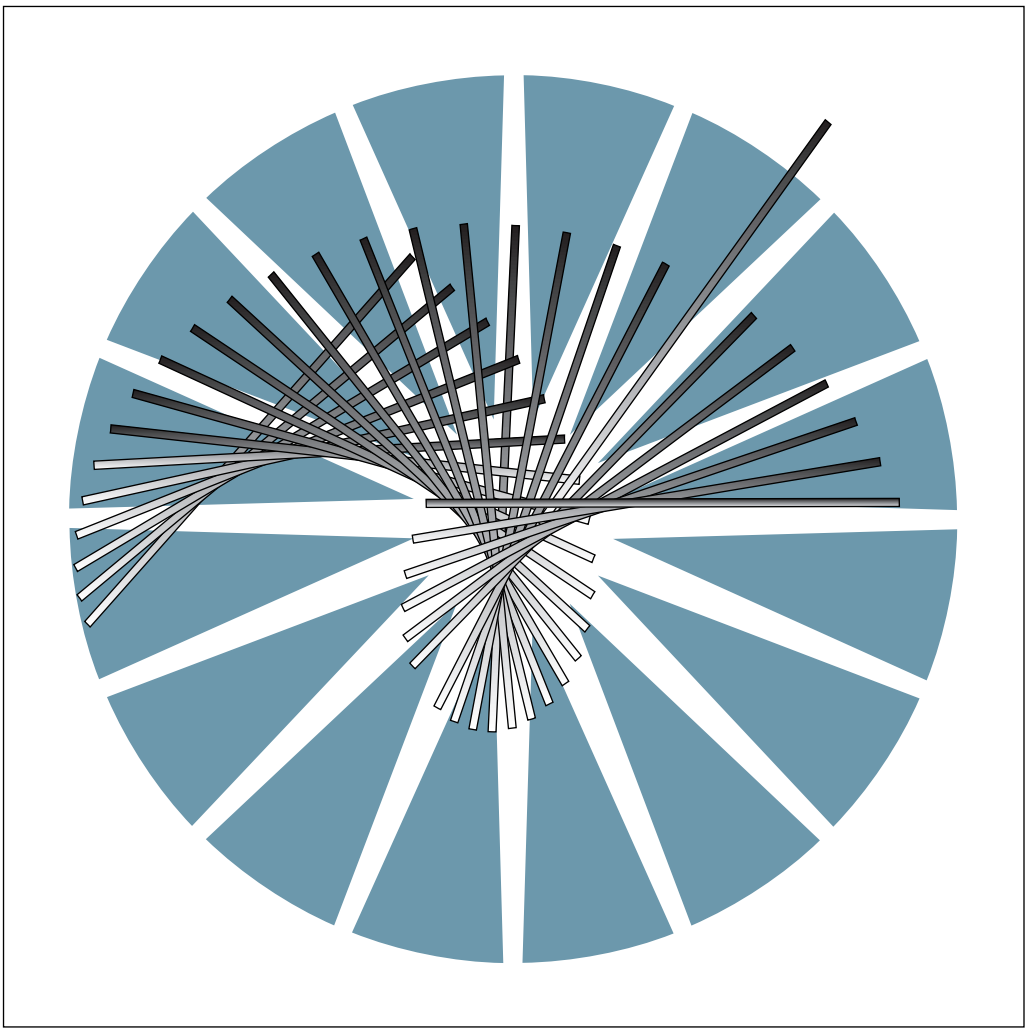
Line Interface Coupler Type 5 and Type 6
Portable Keypad Display

Migration and Integration Guide



SA33-0416-00

Line Interface Coupler Type 5 and Type 6
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Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page ix.

First Edition (October 1996)

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Your LIC 6 (Feature Code 7825-18) is an FCC registered device designed to be used on Digital Data Service (DDS) channels. The availability of these channels is subject to a tariff. Connection to other types of telephone service is prohibited.

Telephone Company Procedures: The goal of the telephone company is to provide you with the best service it can. To do this, it may occasionally be necessary for them to make changes in their equipment, operations, or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service.

If you have any questions about your telephone line, such as how many pieces of equipment you can connect to it, the telephone company will provide this information on request.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment which you have connected to your telephone line. On request of the telephone company, provide the FCC registration number and the ringer equivalence number (REN) of the equipment which is connected to your line; both of these items are listed on the equipment label which is affixed to the face plate.

Your LIC 6 has a telephone cable equipped with an eight position RJ485 plug. You must check that your telephone company is providing a matching socket on the corresponding DDS line.

If Problems Arise: If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they will notify you before this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

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For more information, see the *Safety Information*, GA33-0400.

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2. The network adapter interfaces housed within the IBM 3746 Nways Multiprotocol Controller Model 900 are approved separately, each one having its own independent approval number. These interface adapters, supplied by IBM, do not use or contain excessive voltages. An excessive voltage is one that exceeds 42.4 V peak ac or 60 V dc. They interface with the IBM 3746 Nways Multiprotocol Controller Model 900 using Safety Extra Low Voltages (SELV) only. In order to maintain the separate (independent) approval of the IBM adapters, it is essential that other optional cards, not supplied by IBM, do not use mains voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by IBM.

About this Guide

This guide applies to the:

- Line Interface Coupler Type 5 (LIC 5)
- Line Interface Coupler Type 6 (LIC 6)
- Portable Keypad Display (PKD)

It contains information for the following types of tasks:

- Preparing for modification
- Connecting hardware
- Network integration
- Operating the LIC types 5 and 6 (the modems).

These tasks are performed during later modifications of your IBM 3745 Communication Controller network.

Conventions Used in this Guide

Throughout this guide the term:

3745	Refers to the IBM 3745 (Models 130 to 170 and 210 to 610) with any Expansion Unit (Models A11, A12, L13, L14, and L15) that may be installed.
3745 Model A	Refers to the IBM 3745 (Models 17A, 21A, 31A, 41A and 61A) with any Expansion Unit (Models A11, A12, L13, L14, and L15) that may be installed.
SNA	Refers to the first generation of the Systems Network Architecture with subareas and communication controllers running ACF/NCP. That is host-dependent networking.

Who Should Use this Guide

This guide is intended for personnel responsible for testing and operating the LIC types 5 and 6.

It is also intended for personnel who are responsible for configuration changes of the 3745, such as:

- Network planners
- Network generalists
- System programmers
- System service personnel
- IBM 3745 trained service representatives.

The user should have an understanding of teleprocessing and modem operations.

How this Guide Is Organized

This guide describes the user tasks for:

- Planning network modification
- Connecting and integrating communication lines to the 3745.

It includes the operating procedures for the line interface coupler modems (LIC types 5 and 6).

Important

Before you start a procedure, ensure that you are familiar with the general information at the beginning of chapter and know the requirements for the procedure.

This guide contains the following parts:

- Part 1. Connection and Integration
  - Describes the connection tasks for the hardware: the LICs and the cables
  - Explains the integration tasks
  - Includes a description of the portable keypad display (PKD) and test procedures for the LICs
  - Gives the operating procedures for the modems contained in the LIC 5 and the data service unit in the LIC 6
  - Details the PKD messages.
- Part 2. Migration and Planning
  - Helps to prepare network modification
  - Includes line weight calculation examples.

  At the back of this guide are a list of abbreviations, a glossary, a bibliography, and the index.

Where to Find More Information

"Customer Documentation for the IBM 3745 (Models 210, 310, 410, 610, 21A, 31A, 41A, and 61A), and 3746 (Model 900)" on page X-7

"Additional Customer Documentation for the IBM 3745 Models 130, 150, 160, 170, and 17A" on page X-11

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Part 1. Connection and Integration

Chapter 1. 3745 Models 210 to 61A: Connecting LICs and Cables

This chapter gives the procedures for the 3745 (Models 210 to 61A) hardware connection tasks for LIC types 5 and 6.

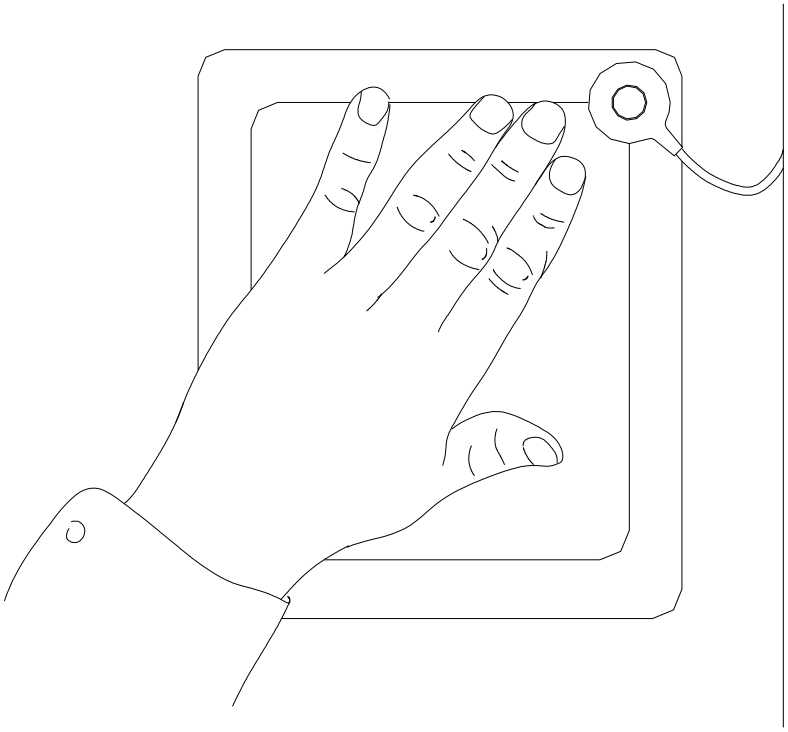
These procedures are performed during **later** modifications of your 3745.

Later modifications refer to changes made at re-installation (after moving the machine or any other time). These later modifications do not require a service representative.

Note: While using the procedures in this chapter, the 3745 can be powered On.

Attention

By touching the inside of the machine, you can cause electrostatic discharges (ESDs) that may result in errors in the system operation, or damage to the equipment. Therefore, it is very important that you touch the ESD plate before you touch any element inside a unit or before you plug in a cable. The ESD plate is located on the inside face of the frame door.



Getting Started

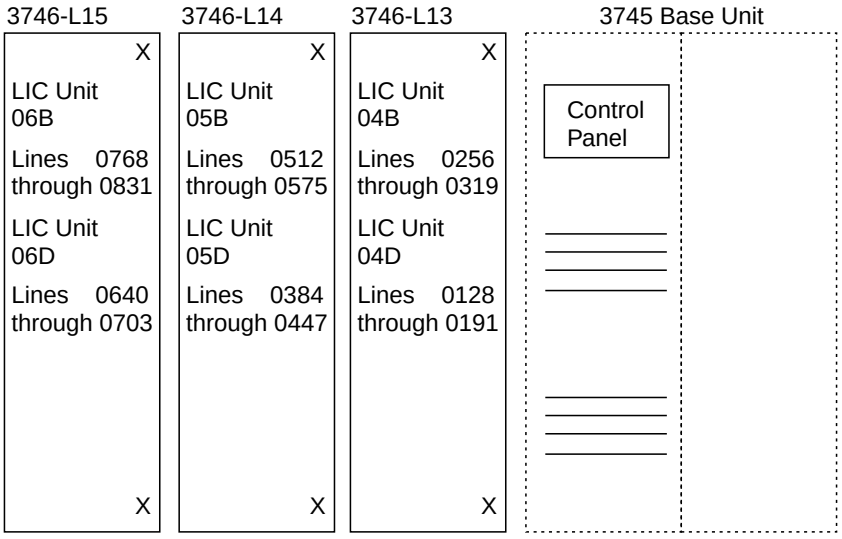
Use this procedure to start all the connection procedures given later in this chapter.

Step 1 Gather the plugging sheets filled from the “Plugging Sheet” on page 8-4 at planning time.

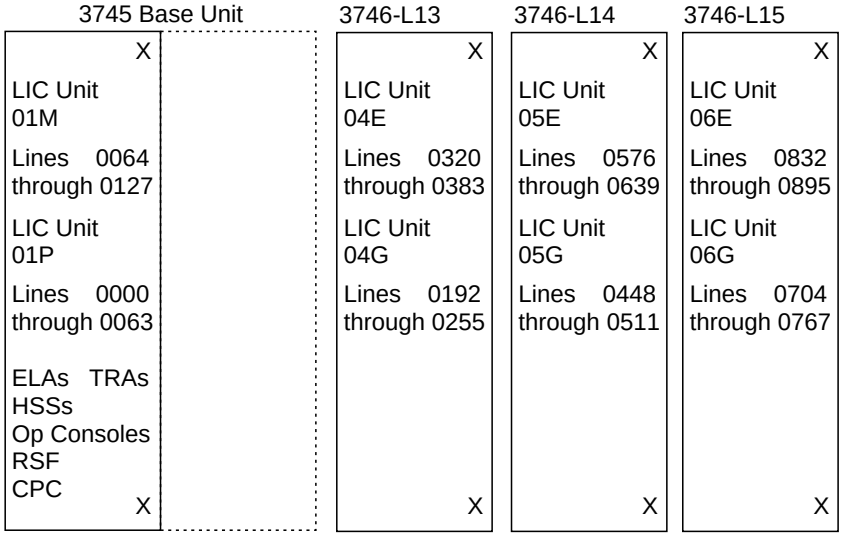
Step 2 Open the door of the unit(s) by pushing in and turning the screws (X in this figure) using the special door key.

Notes:

- The figures below show a 3745 configuration with the maximum number of LIC units available.
- The doors marked with dashed lines are not user-accessible.



Communication Controller Front View



Communication Controller Rear View

Removing or Installing a LIC 5, LIC 6, or Its Cable

Dummy LICs: LIC types 5 and 6 are installed in line interface coupler unit type 2 (LIU2). Empty slots of the LIU2 must contain dummy LICs to ensure proper cooling of the 3745.

LIC Slots: Regardless of the number of ports (lines) that are actually used, two line numbers are allocated for each LIC position in an LIU2.

Line Weights: When reconfiguring LICs, ensure that the total weight of lines connected to a low-speed scanner is within the scanner maximum capacity. To calculate them, see Chapter 10, “LIC 5 and 6 Characteristics and Line Weights.”

Step 1 Starting

If you have not done Steps 1 and 2 of the procedure “Getting Started” on page 1-2, do so now.

Step 2 Locating the LIC slot

Use the LIU tables on the inner surface of the open unit door. Following are schematic representations of the possible locations of LICs and their line numbers within the unit you have opened.

The following tables are for a LIU2 (LIC types 5 and 6).
For LIU1 (LIC types 1 to 4) refer to the *Connection and Integration Guide*, SA33-0129.

LIC 5 Slots

PORTS	C	D	E	F	G	H	J	K
0	064	066	068	070	072	074	076	078
1	065	067	069	071	073	075	077	079

LIC 6 Slots

PORTS	C	D	E	F	G	H	J	K
0	064	066	068	070	072	074	076	078

In this example, **077** is the number of port 1 for the LIC in slot J (in the upper half of the lower LIU 2 of the 3745 base frame unit).

Repeat this step for every LIC to be inserted or removed.

If you are **only installing a LIC**, go to Step 4 on page 1-4.

If you are **only plugging in a LIC cable**, go to Step 8 on page 1-7.

Otherwise, continue with the next step.

Step 3 Deactivating line(s)

Ask the host operator to deactivate all the lines connected to the LIC that you want to work with.

Attention

The LIC types 5 and 6 are scanned in pairs. Before unplugging a LIC 5, LIC 6, or cable, you must first deactivate all line numbers of the **pair of LICs** (even if you are working on one LIC). This will prevent problems at line adapter restart. A LIC pair is an odd-numbered LIC plus an even-numbered LIC.

The line number is the same as the LIC port number.

The upper half of the LIU2 contains the LIC positions 9 through 16.

The following shows the LIU2 located in the base frame:

		LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
PORTS 0 1	Line Number	080 081	082 083	084 085	086 087	088 089	090 091	092 093	094 095
	Position	9	10	11	**12**	13	14	15	16
PORTS 0 1	Line Number	064 065	066 067	068 069	070 071	072 073	074 075	076 077	078 079
	Position	1	2	3	4	5	6	7	8
	Slot	C	D	E	F	G	H	J	K

To replace a LIC 5 in position **12**, you must deactivate lines 84, 85, 86, and 87.

Step 4 Identifying LIC(s)

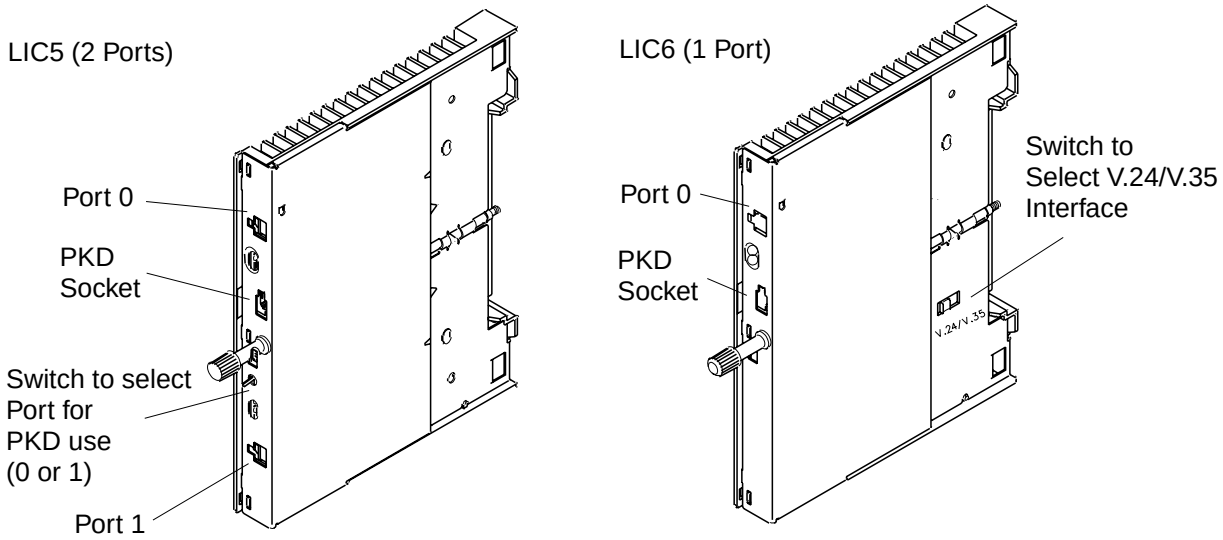


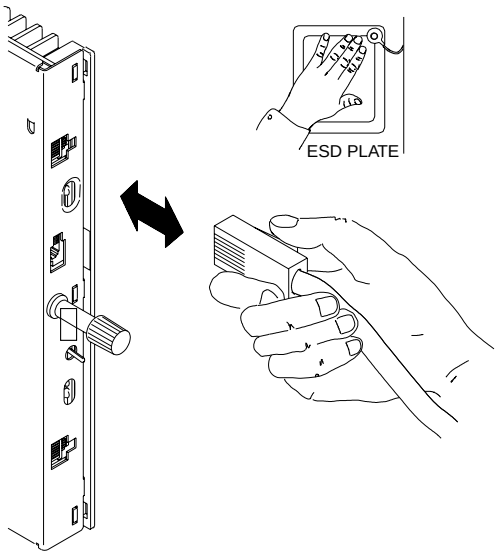
Figure 1-1. LIC Types 5 and 6 in IBM 3745 Models 210 to 61A

LICs are not labeled. To identify a LIC, make a visual inspection.

The **dummy LIC** can be easily recognized because it has no port connectors. It is necessary to install dummy LICs in all empty slots to ensure proper cooling of the 3745.

Step 5 Unplugging LIC cable(s)

Repeat this step for every LIC to be removed.



1. Touch the ESD plate.
2. Unplug the cable from the telecommunication wall socket.
3. Remove the cable from the LIC by squeezing the lever and pulling out the plug.

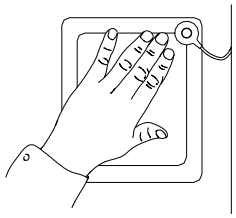
If you are **only unplugging** a LIC cable, go to Step 12 on page 1-9.

If you are **only plugging in** a LIC cable without removing a LIC, go to Step 8 on page 1-7.

Otherwise, **to remove a LIC**, continue with the next step.

Step 6 Removing LIC(s)

Repeat this step for every LIC to be removed.



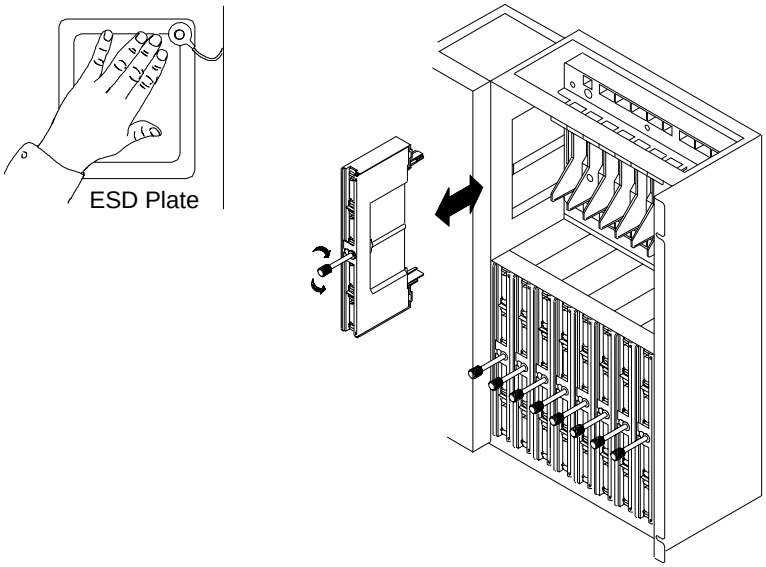
1. Turn the knob counterclockwise to unlock the LIC.
2. Remove the LIC by carefully pulling it out.
3. Insert a dummy LIC if you removed a LIC 5 or 6 and are not going to replace it immediately.

If you have **no LICs** to **install**, go to Step 12 on page 1-9.

Otherwise, continue with the next step.

Step 7 Inserting LIC(s)

Repeat this step for every LIC to be inserted.



1. Ensure that the slot is clear. If necessary, carefully remove the bundle of cables for this LIC row from behind the cable retaining bracket.

   Note: Do not forget to replace the cables behind the retaining bracket when finished.

2. Remove the dummy LIC, if there is one.
3. Before inserting a LIC 6, check that the position of the switch on the side of the LIC agrees with the plugging sheet. If the LIC 6 is to be configured for:

   - 56 000 bps, set the switch to the position marked V.35
   - 19 200 bps or 9600 bps, set the switch to V.24.

   Note: To move the switch, use the tip of a ball-point pen or a similar object.

4. Hold the LIC so that the black plastic side is on the left and the knob is pointing toward you.
5. Push the LIC into the slot until it clicks.

   Attention

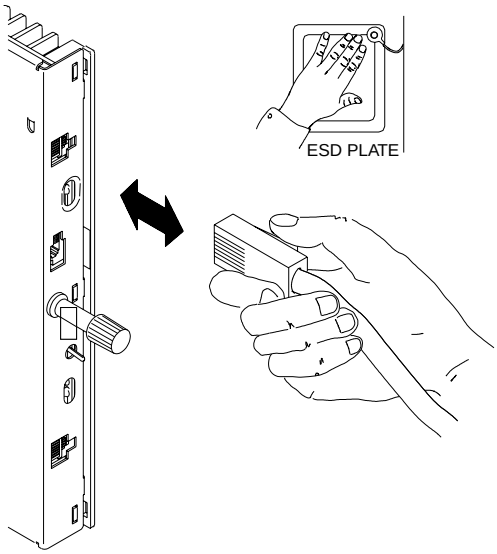
   If the lights flash, the LIC has been plugged into the wrong slot.

6. Turn the knob clockwise to lock the LIC in place.

Step 8 Plugging in LIC type 5 or Type 6 cable(s)

Repeat this step for every LIC or LIC cable installed.

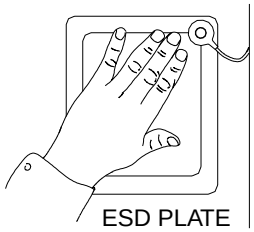
Note: Make sure that all the cables are correctly labeled at both ends before doing this step.



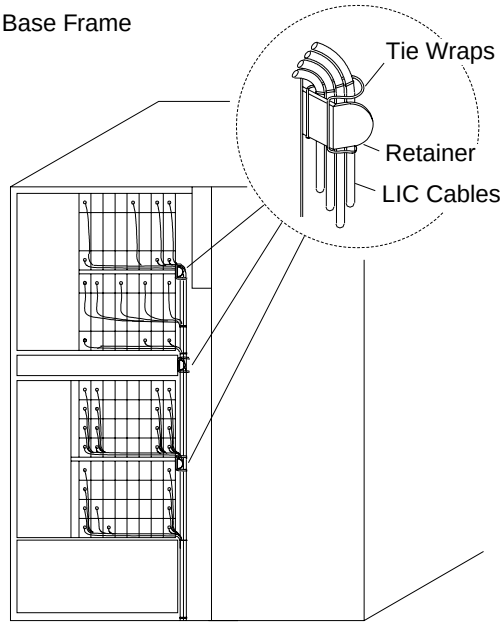
1. Touch the ESD plate.
2. Locate the cable with a label that matches the information on the plugging sheet for the lower port of the LIC.
3. Hold the plug of the cable with the lever on the left, and push it into the port until you hear a click.
4. Plug in the other end of the cable at the telecommunication wall socket.

Step 9 Routing cable(s)

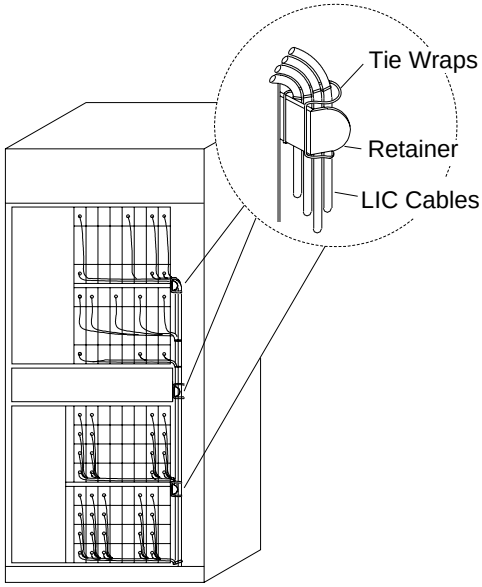
Ensure that all the cables are neatly arranged and well secured. You can use magnetic clamps to separate and neatly arrange the different types of cables. For a drawing of the clamp see Figure 1-2.



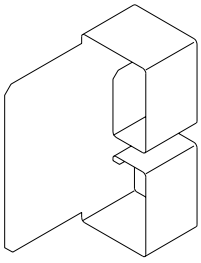
3745 Base Frame



3746-L1x



Magnetic Cable Clamp



If many cables are to be installed, use the magnetic cable clamps. These clamps are available on request. Please contact your IBM service representative. The part number is 26F1775.

Figure 1-2. 3745 Cable Arrangement

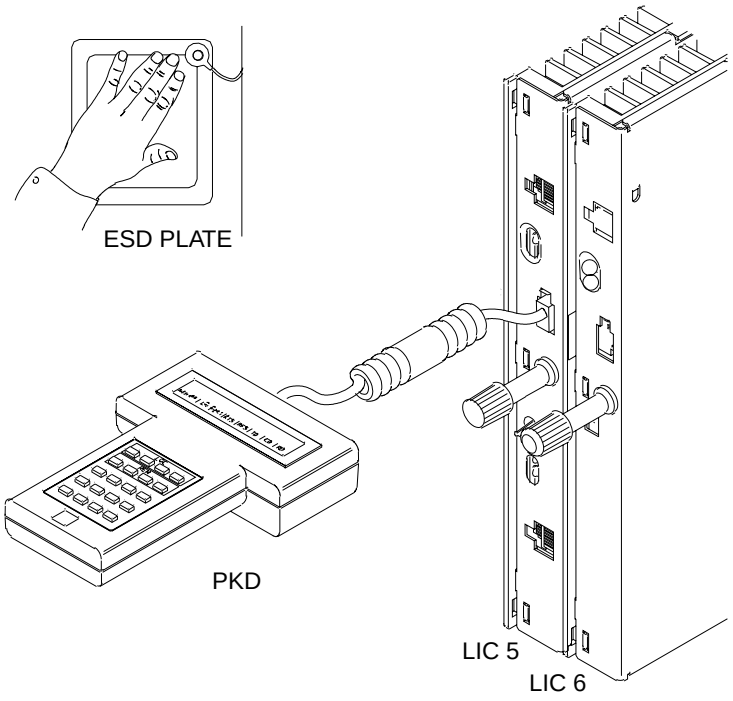
- If you are **only replacing a LIC cable**, go to Step 16 on page 1-10.
- Otherwise, continue with the next step to install a new LIC type 5 or 6 line.

Step 10 Plugging in the PKD

If you are not familiar with the portable keypad display (PKD), refer to Chapter 7, “IBM 5869 PKD Description and Messages.”

The PKD can be used while the LIC is powered ON.

1. Touch the ESD plate.
2. Hold the plug with the lever upward.
3. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the PKD display does not light up, refer to “Troubleshooting the PKD” on page 7-5.
4. For a LIC 5, ensure that the PKD line selector switch on the front of the LIC is up for the port 0 modem or down for the port 1 modem.



Step 11 Configuring the LIC 5 or LIC 6

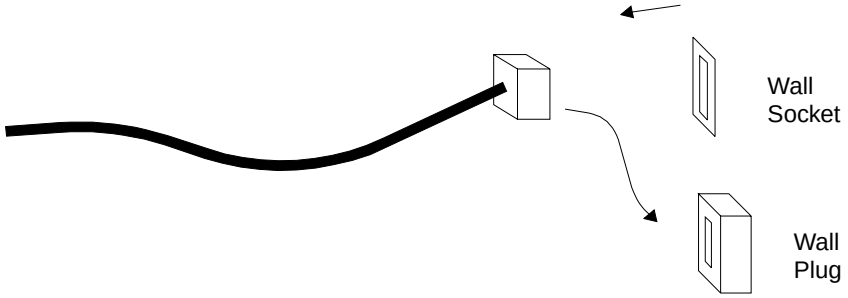
Go to “Configuring a LIC 5 Modem” on page 3-2 or “Configuring a LIC 6 Modem” on page 3-7 and perform the steps as instructed. Then continue with the next step.

Step 12 Updating the CDF

Go to “Upgrading or Updating the CDF” on page 3-12 and perform the steps as instructed. Then continue with the next step.

Step 13 Installing a LIC 5 or LIC 6 Wrap Plug

Install the telecommunication wrap plug by removing the telecommunication cable from the wall socket and plugging it into the wrap plug.



Notes:

a. The telecommunication wrap plug is the female equivalent of the telecommunication cable plug.

b. The plug and wrap socket are country-dependent.

Step 14 Testing a LIC 5 or LIC 6

Perform a local self-test with the 5869 PKD key 0. Refer to Chapter 4, “LIC 5 Test Procedures” or Chapter 5, “LIC 6 Test Procedures.”

When the test-OK message is displayed on the PKD, continue with the next step.

Step 15 Unplugging the PKD

Hold down the lever at the top of the plug and pull out the plug from the LIC 5 or LIC 6.

Repeat Steps 10 to 15 for each LIC 5 and LIC 6 to be installed.

Step 16 Dummy LICs

To ensure proper cooling of the 3745, verify that no LIC 5 or LIC 6 positions have been left empty. Insert dummy LICs in any empty position.

Step 17 Activating the lines

Ask the host operator to activate the line(s) of all newly installed LIC(s) or LIC cable(s).

Attention

If one of the affected lines was not deactivated at Step 3 on page 1-3, you may be forced to re-load the NCP.

Step 18 You have finished this procedure

If you have no other connection procedures to do, close and lock the door using the special door key.

Chapter 2. 3745 Models 130 to 17A: Connecting LICs and Cables

This chapter gives all the procedures for the 3745 (Models 130, 150, 160, 170, and 17A) hardware connection tasks for LIC types 5 and 6.

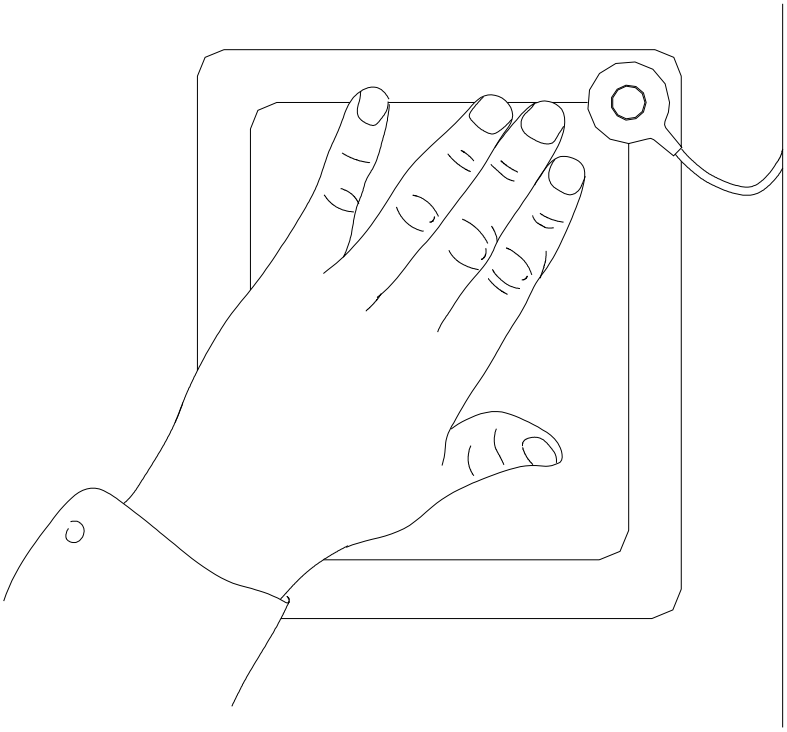
These procedures are performed during **later** modifications of your 3745.

Later modifications refer to changes made at re-installation (after moving the machine or any other time). These later modifications do not require a service representative.

Note: While using the procedures in this chapter, the 3745 can be powered On.

Attention

By touching the inside of the machine, you can cause electrostatic discharges (ESDs) that may result in errors in the system operation, or damage to the equipment. Therefore, it is very important that you touch the ESD plate before you touch any element inside a unit or plug in a cable. The ESD plate is located on the inside face of the frame door.



Getting Started

Use this procedure to start all connection procedures given later in this chapter.

Step 1 Gather the plugging sheets filled from the “Plugging Sheet” on page 8-4 at planning time.

Step 2 Open the rear door of the 3745 unit by pushing in and turning the screws using the special door key.

Removing or Installing a LIC 5, LIC 6, or Its Cable

Dummy LICs: LIC types 5 and 6 are installed in line interface coupler base type 2 (LIB2). Empty slots of the LIB2 must contain dummy LICs to ensure proper cooling of the 3745.

LIC Slots: Regardless of the number of ports (lines) that are actually used, two line numbers are allocated for each LIC position in a LIB 2.

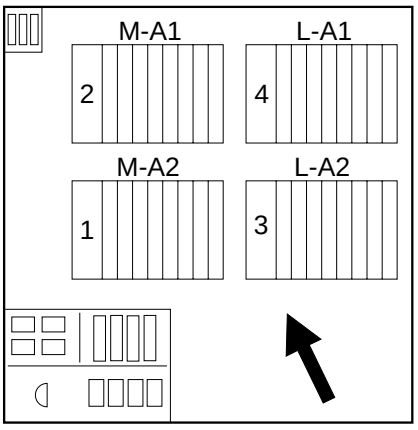
Line Weights: When reconfiguring LICs, ensure that the total weight of lines connected to a low-speed scanner is within the scanner maximum capacity. To calculate them, see Chapter 10, “LIC 5 and 6 Characteristics and Line Weights.”

Step 1 Starting

If you have not done Steps 1 and 2 of the procedure “Getting Started,” do so now.

Step 2 Locating the LIB2 and the LIC slot

Use the port number(s).



- Boards 1 and 2 are **always** LIB type 1, which can be equipped with LIC type 1, 3, and 4.
- Board 4 is **always** a LIB2, which can be equipped only with LIC type 5 and 6.
- Board 3 may be either a LIB1 or a LIB2.

LIB Position 3 (L–A2)

3 (Note)	128 (64) 129	132 (66) 133	136 (68) 137	140 (70) 141	144 (72) 145	148 (74) 149	152 (76) 153	156 (78) 157
	130 (65) 131	134 (67) 135	138 (69) 139	142 (71) 143	146 (73) 147	150 (75) 151	154 (77) 155	158 (79) 159

LIB Position 4 (L–A1)

4	080	082	084	086	088	090	092	094
	081	083	085	087	089	091	093	095

Note: For board 3, if a LIB1 is installed, use the figures that are not in parentheses for the port numbers; for a LIB2, use the figures in parentheses.

If you are **only installing a LIC**, go to Step 4 on page 2-4.

If you are **only plugging in a LIC cable**, go to Step 8 on page 2-6.

Otherwise, continue with the next step.

Step 3 Deactivating the lines

Ask the host operator to deactivate the affected group of lines.

Attention

The LIC types 5 and 6 are scanned in pairs. Before unplugging a LIC 5, LIC 6, or cable, you must first deactivate all line numbers of **the pair** of LICs (even if you are working on one LIC). This will prevent problems at line adapter restart. A LIC pair is an odd-numbered LIC plus an even-numbered LIC.

The line number is the same as the LIC port number.

The upper half of the LIB2 contains the LIC positions 9 through 16.

The following shows the LIB2 located in the base frame:

		LIC	LIC	LIC	LIC	LIC	LIC	LIC	LIC
PORTS 0 1	Line Number	080 081	082 083	084 085	086 087	088 089	090 091	092 093	094 095
	Position	9	10	11	**12**	13	14	15	16
PORTS 0 1	Line Number	064 065	066 067	068 069	070 071	072 073	074 075	076 077	078 079
	Position	1	2	3	4	5	6	7	8
	Slot	C	D	E	F	G	H	J	K

To replace a LIC 5 in position **12**, you must deactivate lines 84, 85, 86, and 87.

Step 4 Identifying LIC(s)

The LICs are not labeled. To identify a LIC, make a visual inspection.

The dummy LIC can be easily recognized because it has no port connectors. It is necessary to install dummy LICs in all empty slots to ensure proper cooling of the 3745.

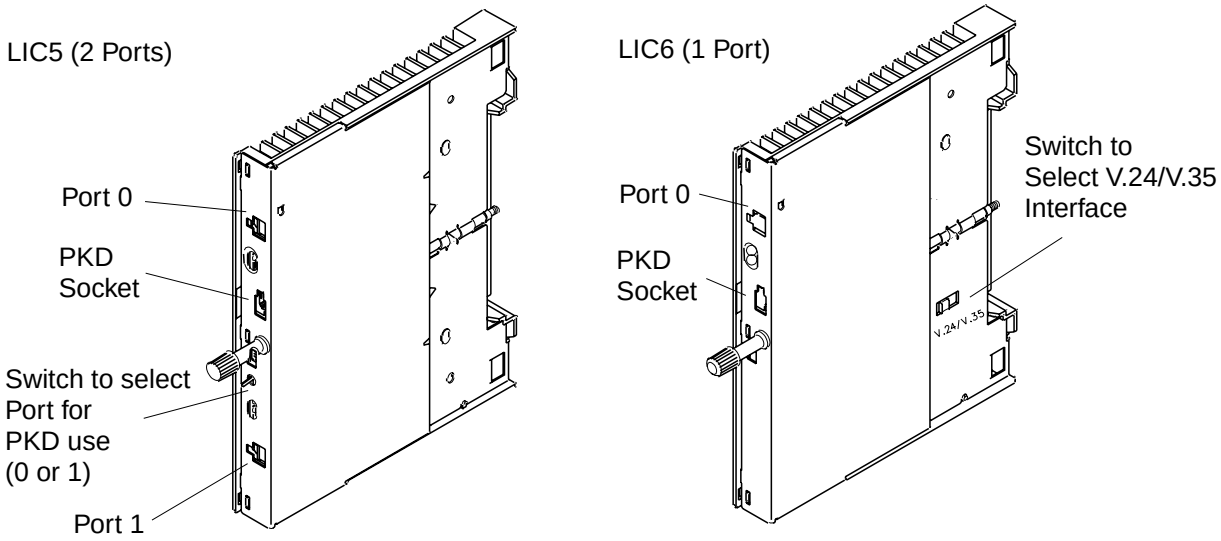
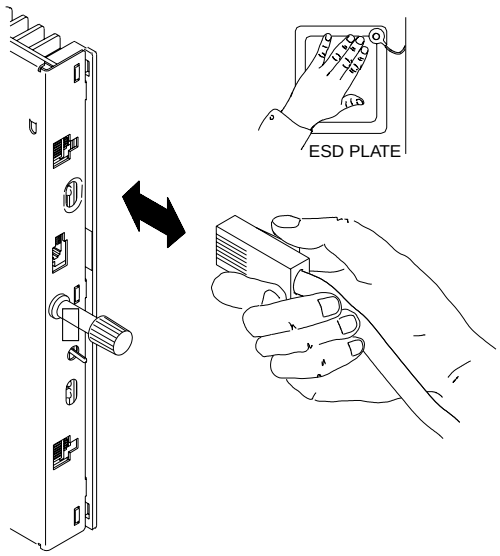


Figure 2-1. LIC Types 5 and 6 in IBM 3745 Models 130 to 17A

Step 5 Unplugging LIC cable(s)

Repeat this step for every LIC to be removed.



1. Touch the ESD plate.
2. Unplug the cable from the telecommunication wall socket.
3. Remove the cable from the LIC by squeezing the lever and pulling out the plug.

If you are **only unplugging** a LIC cable, go to Step 15 on page 2-8.

If you **only** want to **plug in** a LIC cable without removing a LIC, go to Step 8 on page 2-6.

Otherwise, **to remove a LIC**, continue with the next step.

Step 6 Removing LIC(s)

Repeat this step for any LIC to be removed.

1. Touch the ESD plate.
2. Turn the knob counterclockwise to unlock the LIC.
3. Remove the LIC by carefully pulling it out.
4. Insert a dummy LIC if you removed a LIC 5 or 6 and are not going to replace it immediately.

If you have **no LICs** to **install**, go to Step 15 on page 2-8.

Otherwise, continue with the next step.

Step 7 Inserting LIC(s)

Repeat this step for every LIC to be inserted.

1. Touch the electrostatic discharge plate.
2. Ensure that the slot is clear. If necessary, carefully remove the bundle of cables for this LIC row from behind the cable retaining bracket.

   Note: Do not forget to replace the cables behind the retaining bracket when finished.
3. Remove the dummy LIC, if there is one.
4. Before inserting a LIC 6, check that the position of the switch on the side of the LIC agrees with the plugging sheet. If the LIC 6 is to be configured for:
   - 56 000 bps, set the switch to the position marked V.35
   - 19 200 bps or 9600 bps, set the switch to V.24.

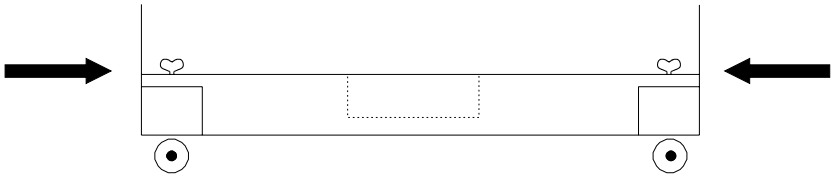
   Note: To move the switch, use the tip of a ball point pen or a similar object.
5. Hold the LIC so that the black plastic side is on the left and the knob is pointing toward you.
6. Push the LIC into the slot until it clicks.

   Attention

   If the lights flash, the LIC has been plugged into the wrong slot.
7. Turn the knob clockwise to lock the LIC in place.

Step 8 Plugging in LIC cable(s)

Note: The cable-retaining bar and ground plate assembly at the base of the machine may be removed to allow easier access to the cables. Remove the two wing screws and lift it out:



If there is no raised floor, remove the retaining bar only.

Note: For your convenience, plug the lower cables into their connectors first.

1. Locate the cable using the port number written on the label.
2. Orient the plug and push it firmly into the corresponding port in the LIC until it clicks.

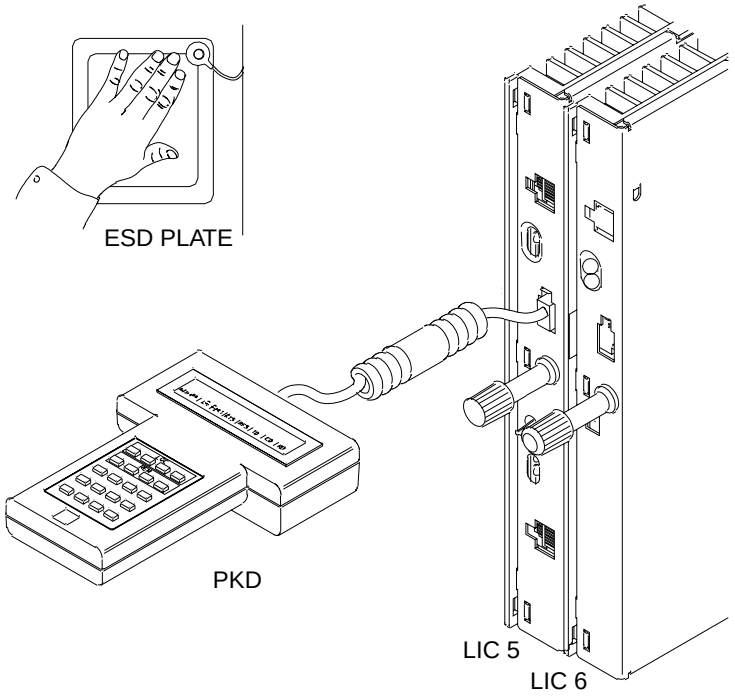
   If necessary, examine the port and the socket to orient the plug correctly before insertion.

Repeat this step for every LIC or LIC cable to be installed.

Step 9 Plugging in the PKD

If you are not familiar with the portable keypad display (PKD), refer to Chapter 7, “IBM 5869 PKD Description and Messages.”

The PKD can be used while the LIC is powered ON.



1. Touch the ESD plate.
2. Hold the plug with the lever upward.
3. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the PKD display does not light up, refer to “Troubleshooting the PKD” on page 7-5.
4. For a LIC 5, ensure that the PKD line selector switch on the front of the LIC is up for the port 0 modem or down for the port 1 modem.

Step 10 Configuring the LIC 5 and LIC 6

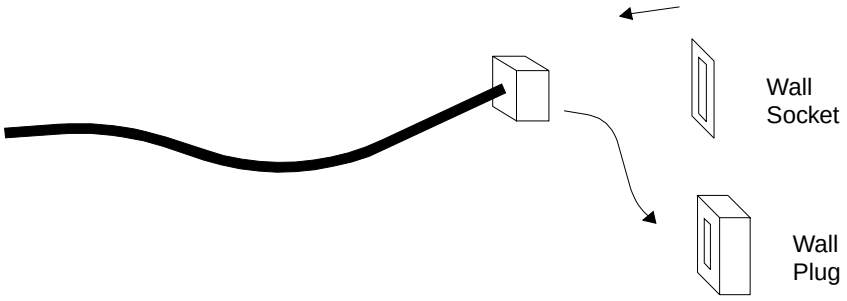
Go to “Configuring a LIC 5 Modem” on page 3-2 or “Configuring a LIC 6 Modem” on page 3-7 and perform the steps as instructed, then continue with the next step.

Step 11 Updating the CDF

Go to “Upgrading or Updating the CDF” on page 3-12 and perform the steps as instructed. Then continue with the next step.

Step 12 Installing a LIC 5 or 6 Wrap Plug

Install the telecommunication wrap plug by removing the cable from the wall socket and plugging it into the wrap plug.



Notes:

a. The telecommunication wrap plug is the female equivalent of the telecommunication cable plug.

b. The plug and wrap socket are country-dependent.

Step 13 Testing the LIC 5 or LIC 6

Perform a local self-test with the 5869 PKD key 0. Refer to Chapter 4, “LIC 5 Test Procedures” or Chapter 5, “LIC 6 Test Procedures.”

When the test-OK message is displayed on the PKD, continue with the next step.

Step 14 Unplugging the PKD

Hold down the lever at the top of the plug and pull out the plug from the LIC 5 or LIC 6.

Repeat Steps 9 to 14 for each LIC 5 and LIC 6 to be installed.

Step 15 Dummy LICs

To ensure proper cooling of the 3745, verify that no LIC 5 or LIC 6 positions have been left empty. Insert dummy LICs in an empty position.

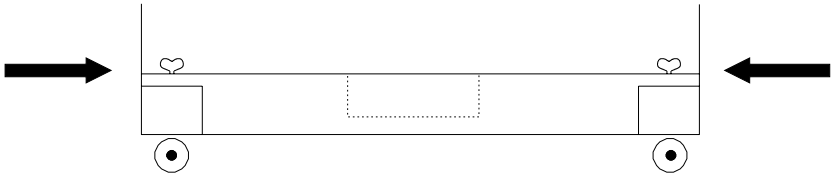
Step 16 Activating lines

Ask the host operator to activate the line(s) of all newly installed LIC(s) or LIC cable(s).

Attention

If one of the affected lines was not deactivated at Step 3 on page 2-3, you may be forced to re-load the NCP.

Step 17 Replace the cable-retaining bar and ground plate assembly (if you removed it earlier).



Note: The ground plate reduces the possibility of radio frequency interference that might be caused by the operating machine. A proper installation of the ground plate is necessary to meet FCC requirements, and to conduct electrostatic discharges to the ground.

Step 18 You have finished this procedure.

If you have no other connection tasks to do, close and lock the door using the special key.

Chapter 3. Integration Procedures

MOSS Integration Procedures

Following are the procedures necessary to accomplish the task of integrating the 3745 base frame hardware into your network using the MOSS.

All of these procedures are explained in more detail as functions in the *Advanced Operations Guide*, SA33-0097.

If you have a 3745 Model A

1. Log on the service processor
2. Open a MOSS window

Refer to the *Basic Operations Guide*, SA33-0177 for detailed operations

On the MOSS function screens you are often asked to press **Entr**. This means press Enter on the service processor keyboard.

Integrating a Modification

Perform the appropriate procedures in the rest of this chapter that apply to your 3745 installation. After you have completed your modification, perform a backup of the 3745 fixed disk. Refer to the *Connection and Integration Guide*, SA33-0129, or the *Advanced Operations Guide*, SA33-0097.

Note:

- When reconfiguring LICs, ensure that the total weight of lines connected to a low-speed scanner is within the scanner capacity.
- To calculate them, see Chapter 10, “LIC 5 and 6 Characteristics and Line Weights.”

Conventions Used in this Chapter for the MOSS

Symbols for the Keys: When you see a keyboard symbol, press and release the corresponding key. For example, C S R Enter means you must press and release the **C** key, the **S** key, the **R** key, and then the **Enter** key, in that order.

Messages Displayed: The messages are displayed as follows:

```
CDF UPGRADE COMPLETED
```

Configuring a LIC 5 Modem

Attention

Configuring or modifying the configuration is disruptive for the entire link in either point-to-point or multipoint configurations. However, scrolling the configuration parameters in read mode without pressing **Erase** is not disruptive.

The LIC 5 can be configured either locally or remotely.

About the Configuration Parameters

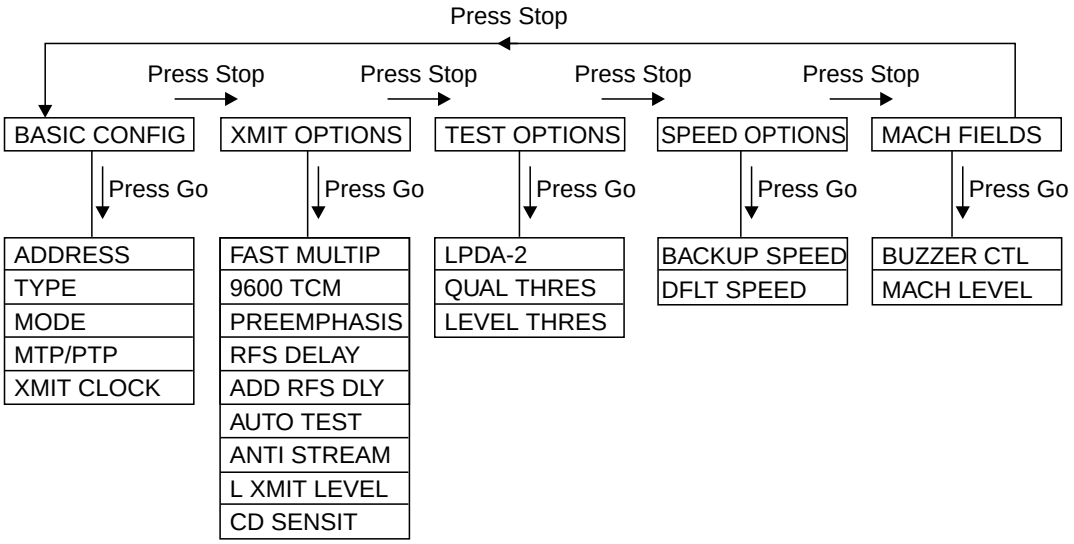


Figure 3-1. LIC 5 Configuration Parameters

Before configuring, ensure that:

1. You have an IBM 5869 PKD: For instructions on how to use the PKD, refer to Chapter 7, “IBM 5869 PKD Description and Messages”
2. You must have a filled in plugging sheet form (see “Plugging Sheet” on page 8-4 for each line of every LIC 5 to be configured.
3. The line selector switch (on the front of the LIC 5) is set to the position matching the port to be configured:
   - Up: port 0 (even-numbered ports)
   - Down: port 1 (odd-numbered ports).

The LIC 5 configuration parameters are organized as a tree with five branches see Figure 3-1.

- Each branch contains a group of parameters
- Each group contains from 2 to 9 parameters
- Several options are available for each parameter, as shown on the LIC 5 plugging sheet.

To display a summary of the current local configuration parameters, see page 6-17.

Preparing the LIC 5 Configuration

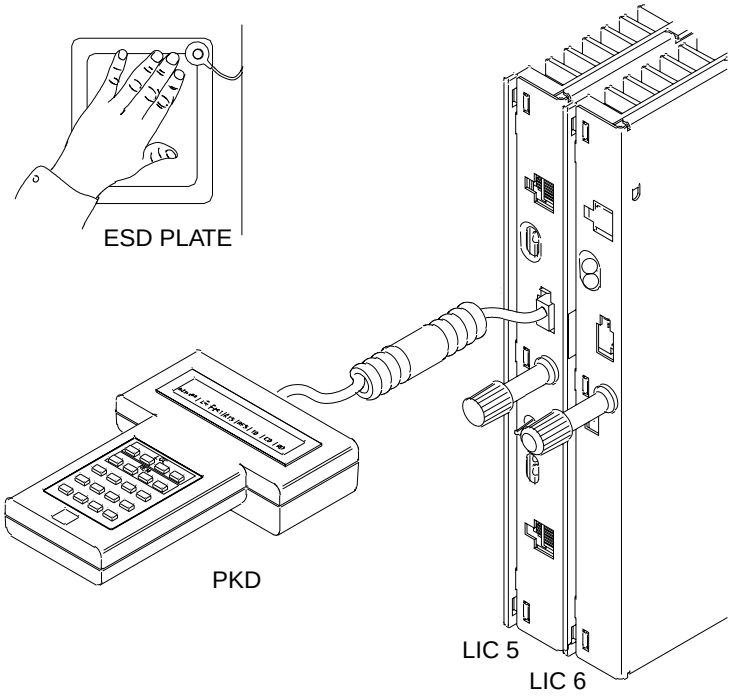
Before starting the configuration of a LIC 5, enter the **LONG TIME OUT** command, which will give you up to 10 minutes to modify each parameter.

Proceed as follows:

Step 1 To plug the PKD into the port to be configured:

a. Hold the plug with the lever upward.

b. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the PKD display does not light up, refer to “Troubleshooting the PKD” on page 7-5.



Step 2 Enter **B666** on the PKD.

Step 3 Press **Go**. When the following message is displayed, the command is successful:

```
LONG TIME OUT
```

Starting a Local Configuration

To start a local configuration, proceed as follows:

Step 1 Press **3**. The display shows:

```
LOCAL CONFIG
```

Step 2 Press **Go**. The display shows:

```
-BASIC CONFIG-
```

Step 3 Press **Go**. The display shows:

```
ADDRESS xx
```

Where xx is the current local LIC 5 address. To accept it, press **Go**. To change it, press **Erase**. The display shows:

```
ADDRESS _ _
```

Step 4 Enter the two-digit address within the range 01 through FB and press **Go** to save it and continue.

Go to “Scrolling the Configuration Parameters” on page 3-6 or “Modifying the Configuration Parameters” on page 3-6.

Starting a Remote LIC 5 Configuration

When configuring a remote LIC 5 from a local LIC 5, the message **RUNNING** is displayed between the time a command is sent and when the result is displayed.

Proceed as follows:

Step 1 Press **7**. The display shows:

```
_ _ REMOTE CONFIG
```

Step 2 Press **Go**. The display shows:

```
-BASIC CONFIG-
```

Step 3 Press **Go**. The display shows:

```
ADDRESS xx
```

Where xx is the current address of the remote LIC 5. To accept it, press **Go**. To change it, press **Erase**. The display shows:

```
ADDRESS _ _
```

Step 4 Enter the two-digit address within the range 01 through FB and press **Go** to save it and continue.

Go to "Scrolling the Configuration Parameters" on page 3-6 or "Modifying the Configuration Parameters" on page 3-6.

Starting a Remote Non-LIC 5 Configuration

Important

Do not use this procedure if the remote device is a LIC 5. This procedure can only be used with modems which have a serial number.

When configuring a remote modem from a local LIC 5:

- The message **RUNNING** is displayed between the time a command is sent and when the result is displayed.
- Consult the remote modem documentation for options and messages.

Proceed as follows:

Step 1 Enter **B555**

Step 2 Press **Go**. The display shows:

```
SERIAL ___
```

Step 3 Enter the serial number of the remote modem and press **Go**. The display shows:

```
ADDRESS xx
```

Where xx is the current address of the remote modem. To accept it, press **Go**. To change it, press **Erase**. The display shows:

```
ADDRESS _ _
```

Step 4 Enter the two-digit address within the range 01 through FB and press **Go** to record it.

Now go to "Scrolling the Configuration Parameters" on page 3-6 or "Modifying the Configuration Parameters" on page 3-6.

Scrolling the Configuration Parameters

To practice scrolling, display the default configuration. After pressing Key **3**, use the keys **Go, Stop**, **Exit**, and Figure 3-1 on page 3-2 to become familiar with scrolling on the keypad display.

By pressing:

Go You go to the next parameter within a group of parameters. For example, from ADDRESS to TYPE.

If the display shows the last parameter of a group, you move to the next branch by pressing **Go**. For example, press **Go** to move from BASIC CONFIG to XMIT OPTIONS.

Stop You go to the next group of parameters, no matter which parameter is displayed.

Exit You stop scrolling the parameters and leave the configuration procedure.

Modifying the Configuration Parameters

There are two kinds of parameters:

- Parameters that you configure by choosing from several fixed options (see “Choosing from Several Options”).
- Parameters that you configure by entering an alphanumerical value (see “Modifying Alphanumerical Options” on page 3-7).

Choosing from Several Options

To choose from several options, press **Erase** until the display shows the desired option. Then press **Go** to record your choice and to move to the next parameter. For example:

```
TYPE 4.8-2.4
```

Press **Erase**.

```
TYPE 9.6-7.2
```

Press **Erase**.

```
TYPE 14.4-12.0
```

Press **Go**.

```
MODE NATIVE
```

Figure 3-2. LIC 5 – Choosing from Several Options

Modifying Alphanumerical Options

To modify alphanumerical options, press **Erase**. When dashes are displayed, enter the required option. Press **Go** to record your modification and to move to the next parameter.
For example:

```
ADD RFS DLY nnn
```

Press **Erase**.

```
ADD RFS DLY _ _
```

Type **200**

```
ADD RFS DLY 200
```

Press **Go**.

```
AUTO TEST NO
```

Figure 3-3. LIC 5 – Modifying Alphanumerical Options

Leaving the Configuration

You can stop the procedure at any time during the configuration, by pressing **Exit**. You then return to the background information display, which gives the current LIC status, (see “LIC 5 Local Configuration Summary Display (Erase Key)” on page 6-17).

If you have just modified the configuration, an automatic self-test is run before the background information is displayed.

Recovering the Default Configuration

If, for any reason, you want to recover the default configuration, enter the command **B100** and press **Go**.

Configuring a LIC 6 Modem

Attention

Configuring or reconfiguring a LIC 6 by using the Key 3 of the PKD is disruptive for the entire link in either point-to-point or multipoint configurations. However, scrolling the configuration options in read mode without pressing **Erase** is not disruptive.

About the Configuration Parameters

Before configuring, ensure that:

1. You have an IBM 5869 PKD: for instructions on how to use the PKD, refer to Chapter 7, “IBM 5869 PKD Description and Messages.”
2. You must have a filled in plugging sheet form(see “Plugging Sheet” on page 8-4) for every LIC 6 to be configured.
3. Check the plugging sheet to see if you have to change the V.24/V.35 switch position. If so, refer to next section.

The LIC 6 configuration parameters are organized as single group, (see Figure 3-4). Two or more options are available for each parameter, as shown on the LIC 6 plugging sheet.

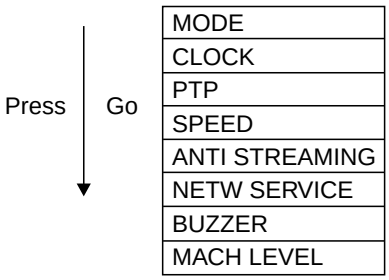


Figure 3-4. LIC 6 Configuration Parameters

To display a summary of the current local configuration parameters, see page 6-19.

Changing the V.24/V.35 Switch Position

Depending on the speed you want to use, you may have to change the V.24/V.35 switch position.

To change the switch position, you must remove the LIC 6, set the switch to the correct position and re-install the LIC 6. Refer to “Removing or Installing a LIC 5, LIC 6, or Its Cable” on page 1-3.

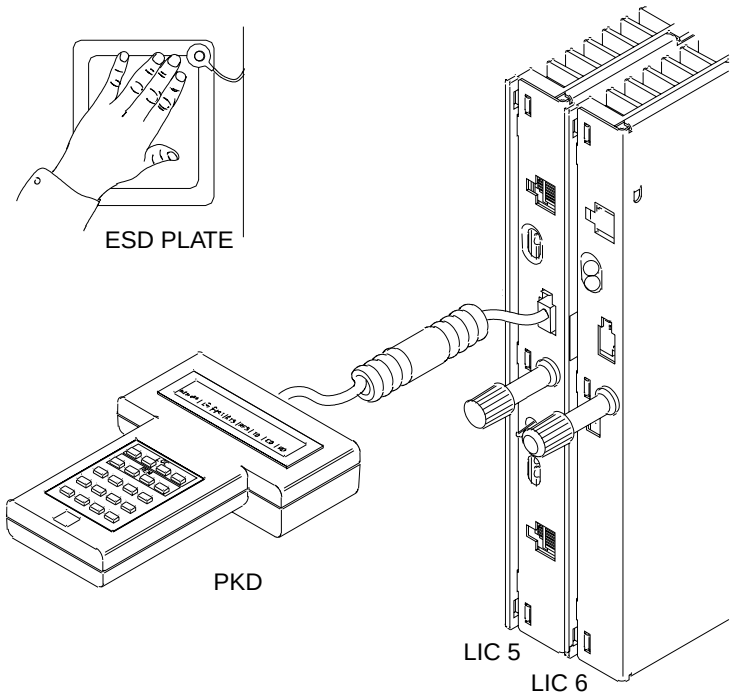
No Long Time Out

There is no **LONG TIME OUT** command on the LIC 6. The messages are displayed for only 20 seconds.

Preparing the LIC 6 Configuration

To plug the PKD into the port to be configured:

1. Touch the ESD plate.
2. Hold the plug with the lever upward.
3. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the PKD display does not light up, refer to “Troubleshooting the PKD” on page 7-5.



Starting the Configuration

Proceed as follows:

Step 1 Press **3**. The display shows:

```
LOCAL CONFIG
```

Step 2 Press **Go**. The display shows:

```
-BASIC CONFIG-
```

Step 3 Press **Go**. The display shows:

```
ADDRESS xx
```

Where xx is the current local LIC 6 address. To accept it, press **Go**. To change it, press **Erase**. The display shows:

```
ADDRESS _ _
```

Step 4 Enter the two-digit address within the range 01 through FB and press **Go** to save it. Go to “Scrolling the Configuration Parameters” on page 3-10 or “Modifying the Configuration Parameters” on page 3-10.

Scrolling the Configuration Parameters

To practice scrolling, display the default configuration. After pressing Key **3**, use the keys **Go** and **Exit** to become familiar with scrolling on the keypad display.

By pressing:

Go You go to the next parameter. For example, from ADDRESS to TYPE.

Exit You stop scrolling the parameters and leave the configuration procedure.

Modifying the Configuration Parameters

There are two kinds of parameters:

- Parameters that you configure by choosing from several fixed options (see "Choosing from Several Options").
- Parameters that you configure by entering an alphanumerical value (see "Modifying Alphanumerical Options" on page 3-10).

Choosing from Several Options

To choose from several options, press **Erase** until the display shows the desired option. Then press **Go** to record your choice and to move to the next parameter. For example:

```
MODE DDS
```

Press **Erase**.

```
MODE LDM
```

Press **Go**.

```
INTERNAL CLOCK
```

Figure 3-5. LIC 6 – Choosing from Several Options

Modifying Alphanumerical Options

To modify alphanumerical options, press **Erase**. When dashes are displayed, enter the required value. Press **Go** to record your modification and to move to the next parameter.

For example:

```
ADDRESS nn
```

Press **Erase**.

```
ADDRESS _ _
```

Type **02**

```
ADDRESS 02
```

Press **Go**.

```
MODE DDS
```

Figure 3-6. LIC 6 – Modifying Alphanumerical Values

Leaving the Configuration

You can stop the procedure at any time during the configuration, by pressing **Exit**. You then return to the background information display, which gives the current LIC status (see “LIC 6 Background Status (Exit Key)” on page 6-20).

If you have just modified the configuration, an automatic self-test is run before the background information is displayed.

Recovering the Default Configuration

If, for any reason, you want to recover the default configuration, enter the command **B100** and press **Go**.

Upgrading or Updating the CDF

Note: It is not necessary to change the CDF if you replace a LIC by a spare LIC of the same type, and do not change the line configuration. Before changing CDF, use the Display/Update CDF procedure, and verify the actual configuration.

- If you want to display or modify **line parameters**, perform an Update.
- If you have made **other hardware changes**, you can use either Upgrade or Update depending on the changes you made.

  In general, use Update for a small number of hardware changes; use Upgrade for many changes, but:

  – If the MOSS is not alone, you can use **Update** to record hardware changes without halting your system. You can at the same time make line parameter changes.
  The only disadvantage is the time it takes to enter each hardware change and the possibility of errors during data entry.

  – Use **Upgrade** if you can stop your system approximately 15 minutes. The hardware changes are put into the CDF automatically and are less error prone.

  The following table compares the two procedures:

Upgrade Procedure	Update Procedure
• Is disruptive at CCU level • Control program removed • MOSS must be alone • Modifies the CDF to record hardware changes when: – Changing a LIC – Changing a LIC cable – Changing a TRA cable – Changing an HSS cable.	• Is disruptive only for the concerned scanners • Control program remains active • MOSS must be on-line • Modifies the CDF to record hardware changes when: – Changing a LIC – Changing a LIC cable – Changing an HSS cable. • Displays LIC, HSS, TRA, and Ethernet LAN adapters (ELA) line parameters and LIC information • Modifies LIC and HSS line parameters.

For more help, refer to the CDF function in the *Advanced Operations Guide*, SA33-0097.

Putting the MOSS On-Line

The following procedure puts the MOSS on-line:

- If the MOSS is **alone**, IPL the 3745 and load the NCP.
- If the MOSS is **off-line**, then for a:
  - Dual CCU 3745, begin at Step 1
  - Single CCU 3745, begin at Step 8.

Step 1 C S R Enter

Step 2 1 Enter

Step 3 F1

Step 4 M O N Enter

When the following message is displayed, continue with the next step.

```
MOSS-ONLINE
```

Step 5 C S R Enter

Step 6 2 Enter

Step 7 F1

Step 8 M O N Enter

When the following message is displayed:

```
MOSS-ONLINE
```

If you have a:

- Single CCU 3745, go to Step 10.
- Dual CCU 3745, continue with the next step.

Step 9 F1

Step 10 You have finished this procedure, continue with other integration procedures or log OFF:

O F F Enter

Chapter 4. LIC 5 Test Procedures

This chapter describes the LIC 5 test procedures using the PKD. For instructions on how to use the PKD, see Chapter 7. If the PKD default time out (20 seconds) expires, or if you press **Exit** during a test, the test is terminated and the background information is displayed (see "LIC 5 Background Status (Exit Key)" on page 6-18).

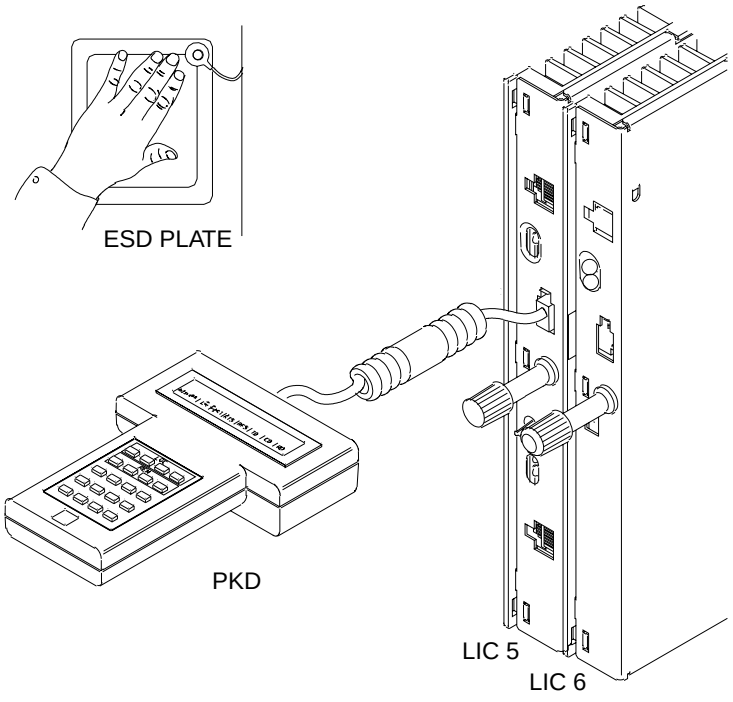
Preparing to Test

Before starting the configuration of a LIC 5, enter the **LONG TIME OUT** command, which will give you up to 10 minutes to modify each parameter.

Proceed as follows:

Step 1 To plug the PKD into the port to be configured:

1. Hold the plug with the lever upward.
2. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the PKD display does not light up, refer to "Troubleshooting the PKD" on page 7-5.



Step 2 Enter **B666** on the PKD.

Step 3 Press **Go**. When the following message is displayed, the procedure is successful.

```
LONG TIME OUT
```

Local Self-Test (Key 0)

Attention

This test is disruptive for the entire link either in point-to-point or multipoint configurations.

The self-test checks the operation of the LIC by performing internal diagnostics and by wrapping test patterns from the transmit section to the receive section.

The test can be run either once as a routine check, or continuously when an intermittent fault is suspected.

Self-Test Without Wrap

To run the test **once only:**

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local test selected.
aa = LIC modem address

Step 2 Press **Stop**. (the display remains the same)

Step 3 Press **Go**.

```
aa RUNNING
```

The test has started.

One of two messages is displayed, depending on whether an error was detected.

```
aa TEST OK NOWRP
```

No errors were detected.

Or

```
aa MODEM FAILED
```

The LIC is faulty. Replace it and run the test again from the beginning.

To run the test **continuously:**

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local test selected.
aa = LIC modem address

Step 2 Press **Go**.

aa TEST nnnnnn

Local test is in progress.
nnnnnn increments each time the test is successfully performed.

The test runs until it fails or until you stop it. If the test fails, it stops and the following message is displayed:

aa MODEM nnnnnn

The LIC is faulty. Replace it and run the test again from the beginning.

Step 3 To stop the test, either:

- Press **Exit**. The display returns to the background status.

  Or

- Press **Stop**. The test report message is displayed:

aa TEST OK NOWRP

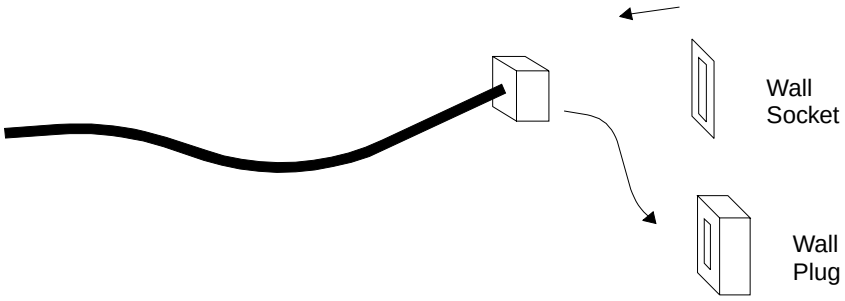
  Press **Exit** to return to the background status.

Self-Test With Wrap

It is possible to check the telecommunication cable as part of the self-test (depending on the country requirements).

Installing the LIC 5 Wrap Plug

Install the telecommunication wrap plug by removing the cable from the telecommunication wall socket and plugging it into the wrap plug.



Notes:

1. The telecommunication wrap plug is the female equivalent of the telecommunication cable plug.
2. The plug and wrap plug are country-dependent.

Testing

To perform the test **once only:**

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local self-test is selected.
aa = LIC modem address

Step 2 Press **Stop**. (the display remains the same)

Step 3 Press **Erase**.

```
aa TEL WRAP
```

The telecommunication line wrap is selected.

Step 4 Press **Go**

```
aa RUNNING
```

The test has started.

Step 5 One of two messages is displayed, depending on whether an error was detected.

```
aa TEST OK NOWRP
```

No errors were detected.

Or

```
aa MODEM FAILED
```

The LIC is faulty. Replace it and run the test again from the beginning.

To perform the test **continuously:**

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local self-test selected.
aa = LIC modem address

Step 2 Press **Erase**.

```
aa TEL WRAP
```

The telecommunication line wrap is selected.

Step 3 Press **Go**.

aa WRAP nnnnnn

Local wrap test is in progress.
nnnnnn increments each time the test is successfully performed.

The test runs until you stop it, or until an error occurs. If an error occurs, the test stops with one of two possible messages displayed:

aa TEST FAILED

The self-test diagnostic failed. The LIC is faulty. Replace it and run the test again from the beginning.

Or

TEST FAILED WRAP

The wrap test failed.
This message appears for one of the following reasons:

- The telecommunication wrap plug is not plugged in.
- The telecommunication wrap plug is faulty.
- The LIC is faulty. Replace it and run the test again from the beginning.

Step 4 To stop the test, either:

- Press **Exit**. The display returns to the background status.

  Or

- Press **Stop**. The test report message is displayed:

aa TEST OK WRAP

  Press **Exit** to return to the background status.

  Remove the telecommunication wrap plug and reconnect the cable to the telecommunication wall socket.

Remote Self-Test (Key 4)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

The remote self-test can be initiated only from a multipoint control LIC 5 using the address of the remote LIC or modem, or from a point-to-point primary LIC 5. A command is sent to the remote LIC or modem, where a single self-test is run and the result is sent back to the local LIC 5.

The following example is from a multipoint control LIC 5. If you are using a point-to-point primary LIC 5, you do not have to enter an address.

Step 1 Press **4**.

```
-- REMOTE TEST
```

Enter the address of the remote LIC or modem (multipoint configuration only).

```
aa REMOTE TEST
```

aa = Remote LIC 5 or modem address.

Step 2 Press **Go**.

```
aa RUNNING
```

Step 3 One of the following messages is displayed:

```
aa TEST OK
```

The test is successful. Go to next step.

```
aa MODEM FAILED
```

```
BAD RESPONSE
```

```
NO RESPONSE
```

Call the service representative.

Step 4 Press **Exit** to return to the background status.

Note: During the test, the message `CMD FROM LINE` is displayed on the remote LIC or modem.

Analog Test (Key 8)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

The analog test measures line impairments. For a complete result, this test must be run after the modem (within the LIC 5) has been operating on a line for at least 15 minutes.

Note: If multiple faults are present on a line, a measurement can be affected by the presence of another fault.

The phase jitter is accurately measured in the frequency range of 50 Hz to 260 Hz. Below and above this range accuracy will drop.

This test can be initiated only from a multipoint control or point-to-point primary LIC 5 and involves both the local LIC 5 and the remote LIC or modem. The following information is displayed during this telecommunication line test, which takes a few seconds.

The following example is from a multipoint control LIC 5. If you are using a point-to-point primary LIC 5, you do not have to enter an address.

In the following, **L** refers to the local modem and **R** refers to the remote modem.

Step 1 Press **8**.

```
-- ANALOG TEST
```

Enter the address of the remote LIC or modem (multipoint configuration only).

The display shows:

```
aa ANALOG TEST
```

aa = Remote LIC 5 or modem address.

Step 2 Press **Go**.

```
aa RUNNING
```

```
aa RL L -nn R -nn
```

Receive Level: This is the power of the received signal level at the local and remote end, expressed in dB.
Values between 0 and -43 dB are displayed.

Step 3 Press **Go**.

```
aa MRL  L -nn R -nn
```

Minimum Receive Level: This is the lowest received level, recorded at the local LIC 5 and remote LICs or modems during the past 15 minutes, expressed in dB. The minus signs (-) are replaced by asterisks (**) if the LIC 5 has been powered on less than 15 minutes when the test is run. For a control LIC 5 (L) this field is not updated and shows two asterisks (**).

Step 4 Press **Go**.

```
aa S/N L  nn R  nn
```

Signal-to-Noise Ratio: This is the ratio of the received signal to received noise at the local and remote end, expressed in dB.
Values less than 25 dB may suggest line degradation.

Step 5 Press **Go**.

```
aa H2  L nn  R nn
```

Second Harmonic Distortion: This is the ratio of the second harmonic power and the fundamental signal power, at the local and remote end, expressed in dB.
Values less than 32 dB may suggest line degradation.

Step 6 Press **Go**.

```
aa H3  L nn  R nn
```

Third Harmonic Distortion: This is the ratio of the third harmonic power and the fundamental signal power, at the local and remote end, expressed in dB.
Values less than 36 dB may suggest line degradation.

Step 7 Press **Go**.

```
aa PJ  L nn  R nn
```

Phase Jitter: This is incidental low-frequency phase modulation of small amplitude, affecting the received signal at the local and remote end, expressed in degrees.
Values above 8 degrees may suggest line degradation.

Step 8 Press **Go**.

```
aa FS  L nn  R nn
```

Frequency Shift: This is a small difference in frequency, between the transmitted signal and received signal, as seen both at the local and remote end, expressed in Hertz.
Values above 6 Hertz may suggest line degradation.

Step 9 Press **Go**.

```
aa HIT L nn R nn
```

Impulse Hits: These are noise peaks of short duration, that are much larger then the normal peaks, affecting the received signal at the local and remote end. These hits are recorded for over 15 minutes. Asterisks (**) before the results show that the result has been accumulated for less than 15 minutes.

Step 10 Press **Go**.

```
aa LBK L nn R nn
```

Line Breaks: These are short interruptions in the received signal over the past 15 minutes, as seen both at the local and remote end. For a multipoint control LIC 5, the L field is not updated and ** is displayed. Asterisks (**) before the results show that the result has been accumulated for less than 15 minutes.

Step 11 Press **Go**.

```
aa RTD  n.nn
```

Round Trip Delay: This is the time needed for a signal to propagate from the local to the remote end and back, expressed in seconds.

Step 12 Press **Go**. The report restarts.

Step 13 Press **Exit** to end the test and to return to the background status.

Notes:

1. For S/N, H2, and H3, if the result is greater than 45 dB, the display shows >45.
2. If the LBK and MRL values can not be measured, two asterisks (**) appear instead of a value.

Digital Test (Key 9)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

This test is possible only for a multipoint control, or point-to-point primary LIC 5.

The local LIC 5 sends a sequence of 16 blocks of data to the remote LIC or modem, which then returns this data to the local LIC 5.

Blocks in error, for each sequence, in both the inbound and outbound directions are counted and displayed at the local site.

Step 1 Press **9**.

```
-- DIGITAL TEST
```

Enter the address of the remote LIC or modem (multipoint configuration only).

```
aa DIGITAL TEST
```

aa = Remote LIC 5 or modem address.

Step 2 Press **Go**.

```
aa RUNNING
```

```
aa * ERR  L nn R nn
```

L nn shows the number of inbound blocks in error for each sequence of 16 blocks. R nn shows the number of outbound blocks in error for each sequence of 16 blocks. The asterisk (*) flashes to show that the test is in progress.

The test repeats itself until you press **Stop**. The displayed readings remain at the level they had when you stopped the test.

Step 3 Press **Exit** to return to the background status.

Tone Test - 1004 Hz (Key B 730)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

For test purposes and on request of a local telephone administration, a permanent tone of 1004 hertz can be sent on the telephone line.

To perform this test:

Step 1 Press **B**. The display shows:

```
---
```

Step 2 Enter **730**. The display shows:

```
1004 HZ LOCKED
```

A permanent tone is sent until you press **Exit** to return to the background status.

Manual Loopback Test (Key F)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

The manual local loopback (loop 3) test wraps the LIC 5 transmitter output to the receiver input. The local data terminal sends data to the LIC 5 and checks the data returned from it. During this test, the LIC 5 is disconnected from the telecommunication line.

For a manual loopback test from any LIC 5:

Step 1 Press **F**. The display shows:

```
aa MANUAL LOOP 3
```

aa = LIC modem address

By pressing **Erase**, you can change loop 3 to loop 2.

Step 2 Press **Go**. The display shows:

Either for loop 3:

```
WRAP L 0 0 F 0 F
```

The test is active. The word WRAP replaces the address and line quality indication on the background status. See Figure 6-3 on page 6-18 for a detailed description.

Or for loop 2:

```
WRAP LQ 00 RL-14
```

During manual remote loopback test, the remote LIC or modem sends back the data it receives from the line.

This test is executed only in point-to-point mode, and only when the receive and transmit speeds are equal. It is initiated from the remote LIC or modem.

Step 3 Press **Exit** when the test is completed to return to the background status.

Chapter 5. LIC 6 Test Procedures

This chapter describes the LIC 6 test procedures using the PKD. For instructions on how to use the PKD, see Chapter 7.

Preparing to Test

Contrary to the LIC 5, there is no **LONG TIME OUT** command available for LIC 6. If the PKD default time out (20 seconds) expires, or you press **Exit** during a test, the test is terminated and the background status is displayed (see "LIC 6 Background Status (Exit Key)" on page 6-20).

Local Self-Test (Key 0)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

The self-test checks the operation of the LIC 6 by performing internal diagnostics and by wrapping test patterns from the transmit section to the receive section.

Self-Test Without Wrap

To perform this test:

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local test selected.
aa = LIC modem address

Step 2 Press **Go**.

```
aa TEST nnnnnn
```

The test has started.
nnnnnn increments each time the test is successfully performed.

The test runs until it fails or until you stop it. If the test fails, it stops with this error message displayed:

```
aa TEST FAILED
```

The LIC 6 is faulty. Replace it and run the test again from the beginning.

Step 3 To stop the test, either:

- Press **Exit**. The display returns to the background status.
- Press **Stop**. The test report message is displayed:

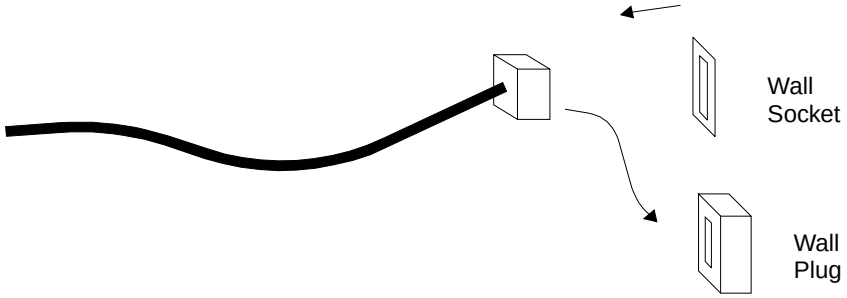
```
aa TEST OK NOWRP
```

Self-Test With Wrap

It is possible to check the telecommunication cable as part of the self-test (depending on the country requirements).

Installing the LIC 6 Wrap Plug

Install the telecommunication wrap plug by removing the cable from the telecommunication wall socket and plugging it into the wrap plug.



Notes:

1. The telecommunication wrap plug is the female equivalent of the telecommunication cable plug.
2. The plug and wrap plug are country-dependent.

Testing

Perform the following procedure:

Step 1 Press **0**.

```
aa LOCAL TEST
```

Local test is selected.
aa = LIC Modem address

Step 2 Press **Erase**.

```
TEL WRAP
```

The telecommunication line wrap is selected.

Step 3 Press **Go**.

```
aa WRAP nnnnnn
```

The test has started.
nnnnnn increments each time the test is successfully performed.

The test runs until it fails or until you stop it. If the test fails, it stops with one of two possible messages displayed:

```
aa TEST FAILED
```

The self-test diagnostic failed.
The LIC 6 is faulty. Replace it and run the test again from the beginning.

```
TEST FAILED WRAP
```

The wrap test failed.
This message appears for one of the following reasons:

- The telecommunication wrap plug is not plugged in.
- The telecommunication wrap plug is faulty.
- The LIC 6 is faulty. Replace it and run the test again from the beginning.

Step 4 To stop the test, either:

- Press **Exit**. The display returns to the background status.
- Press **Stop**. The test report message is displayed:

  ```
  aa TEST OK WRAP
  ```

  Press **EXIT** to return to the background status.

  Remove the telecommunication wrap plug and reconnect the cable to the telecommunication wall socket.

Digital Test (Key 9)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

This test is possible only if the LIC 6 is configured as a multipoint control, or point-to-point primary LIC 6, and Network Services option is ON.

The local LIC 6 sends a sequence of data blocks to the remote LIC or modem, which then returns this data to the local LIC 6. Errors detected in both the outbound and inbound directions are counted and displayed at the local site.

The three main objectives in this test are:

1. Check the integrity of the data path.
2. Confirm the remote LIC or modem address.
3. Check the ability of the remote LIC or modem to receive and transmit data.

Note: This test is not supported when connected to an IBM Modem 5821 Model 10.

To perform this test:

Step 1 Press **9**. The message displayed, depends on the configuration type. It could be either:

```
-- DIGITAL TEST
```

This appears for multipoint. Enter the remote LIC or modem address, in the range 01 to FB.

```
DIGITAL TEST
```

This appears for point-to-point. There is no need to enter an address.

Step 2 Press **Go**. There are two possible messages:

```
aa * ERR L nn R nn
```

For a point-to-point link, no address is displayed.
ERR stands for error.
L nn shows the number of inbound blocks in error for each sequence of 16 messages.
R nn shows the number of outbound blocks in error for each sequence of 16 blocks.
The asterisk (*) flashes to show that the test is in progress.

```
NO RESPONSE
```

No answer from remote mode (this could be due to power off, wrong address, LIC failure, or line problems). Check the remote LIC or modem and the line.

The test repeats itself until you press **Stop**. The displayed readings remain at the level they had when you stopped the test.

Step 3 Press **Exit** to return to the background status.

Manual Loopback Test (Key F)

Attention

This test is disruptive for the entire link (point-to-point or multipoint).

This test (also called loop 3) checks that the 3745 connection to the LIC 6 is functioning properly.
It is performed with the 3745, which generates a test pattern that is sent to the LIC 6. The operation is as follows:

1. The test pattern is sent from the 3745 to the LIC 6.
2. The LIC 6 receives the test pattern, converts it to a telecommunication line signal, and transmits it on toward the line. The signal is wrapped back before the telecommunication line transformer and sent back to the receiver section. The received test pattern signal is converted back to an interface signal level and sent back to the 3745.
3. The 3745 receives the test pattern and verifies it.

To perform this test:

Step 1 Press **F**.

```
aa MANUAL LOOP 3
```

aa = LIC modem address

Step 2 Press **Go**. The display shows:

```
WAIT
```

The loop is being set up.

```
WRAP xxxxx
```

The test is active. The word WRAP replaces the address and line quality indication on the background status. See “LIC 6 Background Status (Exit Key)” on page 6-20.

Step 3 Press **Exit**.

```
WAIT
```

The loop is being removed.

The display then shows either:

- The background status
- Any message that may have been received during the test (see “PKD Messages” on page 7-6).

Chapter 6. LIC 5 and LIC 6 Operating Procedures

This chapter describes how to:

- Display the modem status of the LIC
- Change the modem speed of the LIC
- Display a configuration or a background status.

For instructions on how to use the PKD, see Chapter 7.

If the 20-second display time out expires, the background status is displayed.

For the LIC 5 only (before starting a test), you can extend the time out to 10 minutes. To do so, plug the PKD into a LIC. Then enter **B666** on the PKD and press **Go**. The message `LONG TIMEOUT` is displayed.

LIC 5 Local Status (Key 1)

The local status report gives the 3745 interface status, and at times, the line status.

Requested from a Multipoint Control LIC

An example of a local status requested from a **multipoint control LIC** is:

Step 1 Press **1**.

```
aa LOCAL STATUS
```

aa = LIC address

Step 2 Press **Go**. One of the following messages appears:

```
aa DTR 1
```

Data Terminal Ready (DTR) is ON.

```
aa DTR 0
```

Data Terminal Ready is OFF.

```
aa DTR 0 DROP
```

Data Terminal Ready was turned OFF at least once since the last test.

```
aa DTR 1 DROP
```

Data Terminal Ready was turned ON at least once since the last test.

Step 3 Press **Go**. One of the following messages appears:

```
aa RTS 1
```

Request to Send (RTS) is ON.

`aa RTS 0`	Request to Send is OFF.
`aa RTS 1 RAISED`	Request to Send came ON at least once since the last test.
`aa RTS 0 RAISED`	Request to Send was turned OFF at least once since the last test.

Step 4 Press **Go**. One of the following messages appears:

`aa RFS 0`	Ready for Sending (RFS) is OFF.
`aa RFS 1`	Ready for Sending is ON.
`aa RFS 1 RAISED`	Ready for Sending came ON at least once since the last test.
`aa RFS 0 RAISED`	Ready for Sending was turned OFF at least once since the last test.

Step 5 Press **Go**. One of the following messages appears:

`aa RD ACTIVE`	Data has been received since the last test.
`aa RD INACTIVE`	No data has been received since the last test.

Step 6 Press **Go**. One of the following messages appears:

`aa TD ACTIVE`	Data has been transmitted since the last test.
`aa TD INACTIVE`	No data has been transmitted since the last test.

Step 7 Press **Go**. One of the following messages appears:

```
aa 9600
```

Current transmit speed of the corresponding port of the LIC. The speed displayed is the speed previously set by the user.

```
aa 9600 CHANGED
```

The speed was changed since the last test.

Step 8 Press **Go**. One of the following messages appears:

```
aa REM PWR OFF
```

The remote LIC or modem was powered OFF at least once since the last test.

```
aa MODEM REINIT
```

The remote LIC or modem was reinitialized.

```
aa REMOTE FAILED
```

Failure indication has been received from a remote LIC or modem. Ask the operator to check the remote LIC or modem.

```
aa END OF REPORT
```

Step 9 Press **Exit** to return to the background status.

Requested from a Tributary, Point-to-Point Primary, or Secondary LIC

An example of a local status requested from a tributary LIC 5 or modem, point-to-point primary, or point-to-point secondary LIC or modem, is:

Step 1 Press **1**.

```
aa LOCAL STATUS
```

The following message appears only when the test is requested from a tributary LIC 5 or modem.

Step 2 Press **Go**.

```
aa STREAMING
```

Request to Send (RTS) has stayed ON for 20 to 40 seconds, according to the LIC speed, if the configuration was set to ANTISTREAM YES.

Step 3 Press **Go**. One of the following messages appears:

`aa LOC LQ GOOD`	Line quality test.
`aa LOC LQ POOR`	
`aa LOC LQ NONE`	

Step 4 Press **Go**. One of the following messages appears:

`aa DTR 1`	Data Terminal Ready (DTR) is ON.
`aa DTR 0`	Data Terminal Ready is OFF.
`aa DTR 1 DROP`	Data Terminal Ready was turned OFF at least once since the last test.
`aa DTR 0 DROP`	Data Terminal Ready was turned ON at least once since the last test.

Step 5 Press **Go**.

`aa * LQ 00 RL -03`	Line quality and receive level (see notes below).

Notes:

1. An asterisk (*) flashes during each test to show that the test is being performed continuously. If you press **Stop**, the display is no longer refreshed and the readings remain at their current levels.
2. Line quality is 00 to 15. A low number denotes a line of good quality. Above 08, the line may be the contributing factor to an increased error rate.
3. Receive level is measured in dB (decibel).

Step 6 Press **Stop** to continue with the status report.

Step 7 Press **Go**.

`aa HIT COUNT *00`	Number of line hits during the past 15 minutes. An asterisk (*) precedes the number of line hits if the LIC has not been operating for at least 15 minutes.

Step 8 Press **Go**. One of the following messages appears:

`aa RTS 1`	Request to Send (RTS) is ON.
`aa RTS 0`	Request to Send is OFF.
`aa RTS 1 RAISED`	Request to Send came ON at least once since the last test.
`aa RTS 0 RAISED`	Request to Send was turned OFF at least once since the last test.

Step 9 Press **Go**. One of the following messages appears:

`aa RFS 0`	Ready for Sending (RFS) is OFF.
`aa RFS 1`	Ready for Sending is ON.
`aa RFS 1 RAISED`	Ready for Sending came ON at least once since the last test.
`aa RFS 0 RAISED`	Ready for Sending was turned OFF at least once since the last test.

Step 10 Press **Go**. One of the following messages appears:

`aa RD ACTIVE`	Data has been received since the last test.
`aa RD INACTIVE`	No data has been received since the last test.

Step 11 Press **Go**. One of the following messages appears:

```
aa TD ACTIVE
```

Data has been transmitted since the last test.

```
aa TD INACTIVE
```

No data has been transmitted since the last test.

Step 12 Press **Go**. One of the following messages appears:

```
aa 9600
```

Current transmit speed of the corresponding port of the LIC. The speed displayed is the speed previously set by the user.

```
A  9600 CHANGED
```

The speed was changed since the last test.

Step 13 Press **Go**. One of the following messages appears:

```
aa REM PWR OFF
```

The remote LIC or modem was powered OFF at least once since the last test.

```
aa MODEM REINIT
```

The LIC was reinitialized.

```
aa REMOTE FAILED
```

Failure indication has been received from a remote LIC or modem. Ask the operator to check the remote LIC or modem.

```
aa END OF REPORT
```

Step 14 Press **Exit** to return to the background status.

LIC 5 Local Speed Change (Key 2)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

You can locally change the speed of a multipoint control and a point-to-point primary LIC. You can not change the speed of a multipoint tributary LIC 5 or modem and a point-to-point secondary LIC or modem in native mode this way.

Note: In the following example of speed change, the speeds shown are only examples. The speeds on your display may be different according to your configuration.

Step 1 Press **2**. The display shows:

```
aa 14.4 TO 12
```

aa = LIC address

Step 2 Press **Go**.

```
aa NEW SPD 12000
```

Step 3 Press **Exit**.

To return to full speed, proceed as follows:

Step 1 Press **2**. The display shows:

```
aa 12 TO 14.4
```

Step 2 Press **Go**. The display shows:

```
aa NEW SPD 14400
```

Step 3 Press **Exit** to return to the background status.

LIC 5 Remote Status (Key 5)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

This is the remote DTE interface status.

Requested from a Control LIC

The following example is for a multipoint control LIC. For a point-to-point primary LIC you do not enter an address.

An example of a remote status report requested from a **control LIC** is:

Step 1 Press **5**.

```
-- REMOTE STATUS
```

Enter the address of the remote LIC or modem (multipoint configuration only).

The display shows:

```
aa REMOTE STATUS
```

aa = Remote LIC address.

Step 2 Press **Go**. The display shows:

```
aa RUNNING
```

After this step, one of the following messages appears:

```
aa NO RESPONSE
```

Invalid address or line problem.

```
-- PORT ADDRESS
```

Enter the port address of the remote modem.

```
aa STREAMING
```

Request to Send (RTS) has stayed ON for 20-40 seconds, according to the LIC speed, if the configuration was set to ANTISTREAM YES.

```
aa LOC LQ GOOD
```

Line quality is good at the local side. The remote port address is not displayed when the test is requested from a primary LIC.

Step 3 Press **Go**.

```
aa REM LQ GOOD
```

Line quality is good at the remote side. The remote port address is not displayed when the test is requested from a primary LIC.

Step 4 Press **Go**. The display shows either:

```
aa DTR 1
```

Data Terminal Ready (DTR) is ON.

```
aa DTR 0
```

Data Terminal Ready is OFF.

```
aa DTR 1 DROP
```

Data Terminal Ready was turned OFF at least once since the last test.

aa DTR 0 DROP	Data Terminal Ready was turned ON at least once since the last test.

Step 5 Press **Go**.

aa L LQ 00 RL 01	Line quality and received level at the local side. The remote port address is not displayed when the test is requested from a primary LIC.

Step 6 Press **Go**.

aa R LQ 00 RL 00	Line quality and received level at the remote side. The remote port address is not displayed when the test is requested from a primary LIC.

Step 7 Press **Go**.

aa HIT COUNT * 00	Number of line hits during the past 15 minutes. An asterisk (*) precedes the number of line hits if the LIC has not been operating for at least 15 minutes. The remote port address is not displayed when the test is requested from a primary LIC.

Step 8 Press **Go**. One of the following messages appears:

aa RTS 1	Request to Send is ON.
aa RTS 0	Request to Send is OFF.
aa RTS 1 RAISED	Request to Send came ON at least once since the last test.
aa RTS 0 RAISED	Request to Send was turned OFF at least once since the last test.

Step 9 Press **Go**. One of the following messages appears:

`aa RFS 0`	Ready for Sending (RFS) is OFF.
`aa RFS 1`	Ready for Sending is ON.
`aa RFS 1 RAISED`	Ready for Sending came ON at least once since the last test.
`aa RFS 0 RAISED`	Ready for Sending was turned OFF at least once since the last test.

Step 10 Press **Go**. One of the following messages appears:

`aa RD ACTIVE`	Data has been received since the last test.
`aa RD INACTIVE`	No data has been received since the last test.

Step 11 Press **Go**. One of the following messages appears:

`aa TD ACTIVE`	Data has been transmitted since the last test.
`aa TD INACTIVE`	No data has been transmitted since the last test.
`aa DTE ON`	The remote DTE is powered ON.
`aa DTE ON DROP`	The remote DTE has been powered OFF since the last test.
`aa DTE OFF`	The remote DTE is powered OFF.
`aa DTE OFF DROP`	The remote DTE has been powered ON since the last test.

Step 12 Press **Go**. One of the following messages appears:

`aa 9600`	Current transmit speed of the corresponding remote LIC or modem port. The speed displayed is the LIC speed set previously by the user.
`aa 9600 CHANGED`	The remote LIC or modem speed was changed since the last test.

Step 13 Press **Go**. One of the following messages appears:

`aa REM PWR OFF`	The remote LIC or modem was powered OFF at least once since the last test.
`aa MODEM REINIT`	The LIC was reinitialized.
`aa REMOTE FAILED`	Failure indication has been received from a remote LIC or modem. Ask the operator to check the remote LIC or modem.
`aa CARRIER LOSS`	There has been a drop of activity on the carrier line since the last test.
`aa END OF REPORT`	

Step 14 Press **Exit** to return to the background status.

LIC 5 Remote Full-Speed Change (Key 6)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

From a point-to-point primary and a multipoint control LIC, you can initiate a remote full-speed change to another point-to-point primary, a point-to-point secondary, a single addressed multipoint tributary, or simultaneously to all multipoint tributaries.

Single LIC Speed Change

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

In a multipoint configuration, you must enter the address of the remote tributary LIC 5 or modem. In a point-to-point configuration, no address is needed.

Step 1 Press **6**. The display shows:

```
REM SPD FULL
```

Enter the address of the remote LIC or modem (multipoint configuration only).

Step 2 Press **Go**. If the remote LIC or modem is already at full speed, the display shows:

```
ALREADY 9600
```

If the speed has been changed, the display shows:

```
NEW SPD 9600
```

Step 3 Press **Exit** to return to the background status.

Broadcast Full Speed Change

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

A multipoint control modem within a LIC can simultaneously change all tributary LIC 5 or modem speeds by using the address **FD.**

Step 1 Press **6**. The display shows:

```
-- REM SPD FULL
```

Step 2 Press **F**, then **D**. The display shows:

```
FD REM SPD 9600
```

Step 3 Press **Go**.

Step 4 Press **Exit** to return to the background status.

LIC 5 Remote Backup-Speed Change (Key A)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

From a point-to-point primary and a multipoint control LIC, you can initiate a remote full-speed change to another point-to-point primary, a point-to-point secondary, a single addressed multipoint tributary, or simultaneously to all multipoint tributaries.

Single LIC Speed Change

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

In a multipoint configuration, you must enter the address of the remote tributary LIC 5 or modem. In a point-to-point configuration, no address is needed.

Step 1 Press **A**. The display shows:

```
REM SPD BACK
```

Enter the address of the remote LIC or modem (multipoint configuration only).

Step 2 Press **Go**. If the remote LIC or modem is already at backup speed, the display shows:

```
ALREADY 7200
```

Or

If the speed has been changed, the display shows:

```
NEW SPD 7200
```

Step 3 Press **Exit** to return to the background status.

Broadcast Backup-Speed Change

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

A multipoint control LIC 5 can simultaneously change all tributary LIC 5 or modem speeds by using the address **FD.**

Step 1 Press **A**. The display shows:

```
-- REM SPD BACK
```

Step 2 Press **F**, then **D**. The display shows:

```
FD REM SPD 9600
```

Step 3 Press **Go**.

Step 4 Press **Exit** to return to the background status.

LIC 5 Remote Contact Sense/Operate Facility (Keys B 703, B 704, and B 705)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

The Contact Operate function allows the user to command a remote LIC or modem to close or open an integrated relay.

The Contact Sense function allows the user to detect whether the relay is open or closed and whether an electric current is flowing.

Although this function is physically located within the two-wire coupler housing, it is a separate function and sense/operate functions may be issued when the LIC is operating normally.

Function	Remote
Contact Operate (CO) OFF	B 703
Contact Operate (CO) ON	B 704
Contact Sense/Contact Operate Status	B 705

These functions can be requested on a point-to-point or multipoint link. In point-to-point, there is no address. In multipoint, you enter the address of the remote LIC or modem.

To set the Contact Operate to OFF on the remote LIC or modem:

Step 1 Press **B**. The display shows:

```
---
```

Step 2 Enter **703**

Step 3 Press **Go**.

In the following messages, no address is displayed in a point-to-point link. In a multipoint link, the remote LIC or modem address is displayed at the beginning of the message.

```
REMOTE CO=OFF
```

In point-to-point link.

```
-- REMOTE CO=OFF
```

In multipoint link, enter the address of the remote LIC or modem.

Step 4 Press **Go**.

In the following messages, no address is displayed in a point-to-point link. In a multipoint link, the remote LIC or modem address is displayed at the beginning of the message.

```
RUNNING
```

Followed by:

```
CO SET OFF
```

This message shows that the relay connected to the remote LIC or modem has been turned OFF.

```
NO RESPONSE
```

Invalid address or line problem.

To set the Contact Operate to ON in the remote LIC or modem:

Step 5 Press **B**. The display shows:

```
---
```

Step 6 Enter **704**

Step 7 Press **Go**. The display shows:

```
REMOTE CO=ON
```

In point-to-point link.

```
-- REMOTE CO=ON
```

In multipoint link, enter the address of the remote LIC or modem.

Step 8 Press **Go**.

In the following messages, no address is displayed in a point-to-point link. In a multipoint link, the remote LIC or modem address is displayed at the beginning of the message.

```
RUNNING
```

```
CO SET ON
```

This message shows that the relay connected to the remote LIC or modem has been turned OFF.

To obtain the Contact Sense/Operate status of the remote LIC or modem: at any time a status of both the Contact Operate (CO) and Contact Sense (CS) of the remote LIC or modem may be displayed.

Step 9 Press **B**. The display shows:

```
---
```

Step 10 Enter **705**

Step 11 Press **Go**. The display shows:

```
REMOTE CS-CO
```

In point-to-point link.

Or

```
-- REMOTE CS-CO
```

In multipoint link, enter the address of the remote LIC or modem.

Step 12 Press **Go**.

In the following messages, no address is displayed in a point-to-point link. In a multipoint link, the remote LIC or modem address is displayed at the beginning of the message.

```
RUNNING
```

```
CO=ON CS=NO
```

LIC 5 Disconnecting a Remote SNBU LIC (Key E)

Attention

This procedure is disruptive for the entire link in both multipoint and point-to-point configurations.

This function allows you to disconnect a remote LIC or modem working in SNBU.

Note: A local LIC 5 can not be connected in SNBU.

Step 1 Press **E**. The display shows:

```
aa DISCONNECT
```

aa = local modem address within the LIC.

Step 2 Press **Go**. The display shows:

```
NO FEATURE
```

The remote SNBU modem is disconnected.

Step 3 Press **Exit** to return to the background status.

LIC 5 Local Configuration Summary Display (Erase Key)

When the background status is displayed, you can obtain the local configuration summary by pressing **Erase** and holding it down. This summary is displayed while **Erase** is held down between 0.5 and 5 seconds. Figure 6-1 explains the meanings of the values displayed.

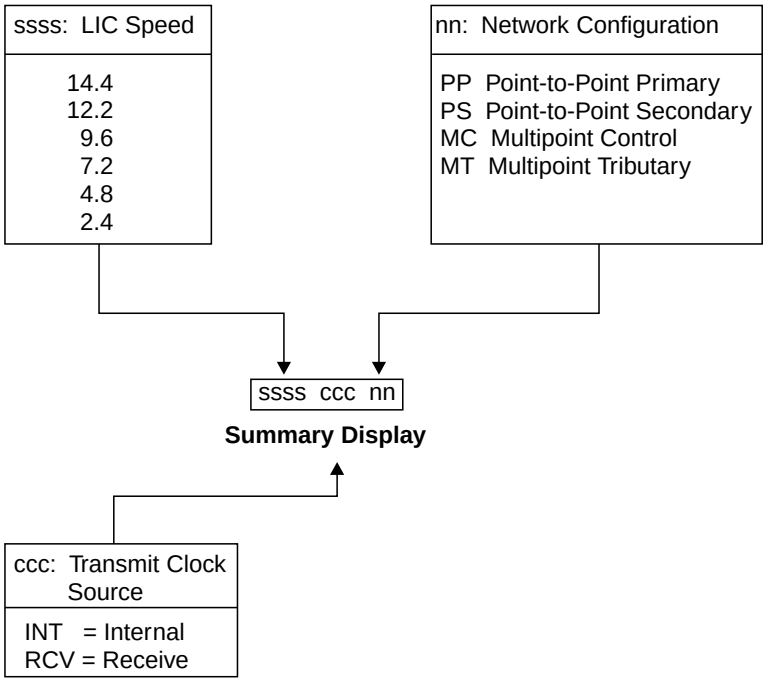


Figure 6-1. LIC 5 Configuration Summary

LIC 5 Background Status (Exit Key)

The background status is present on the PKD whenever there is no test activity. It provides a constant indication of the LIC status. Pressing **Exit** during a test procedure restores the background status.

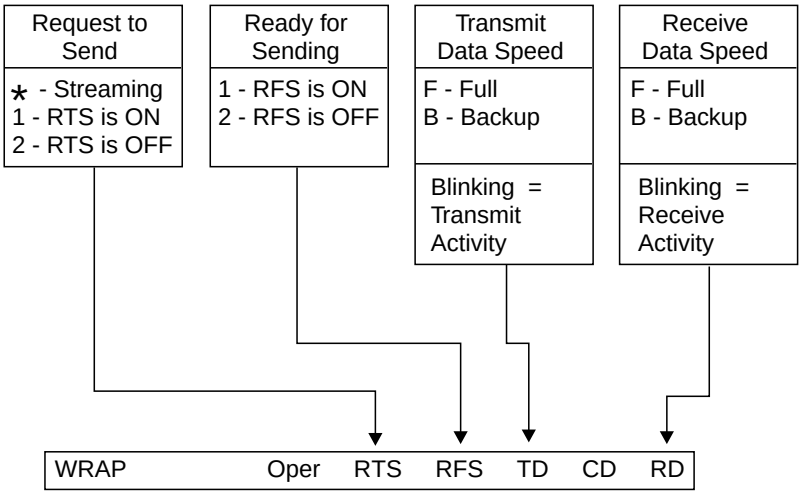


Figure 6-2. LIC 5 PKD Wrap Display

Figure 6-2 results from a “Manual Loopback Test (Key F)” on page 4-10

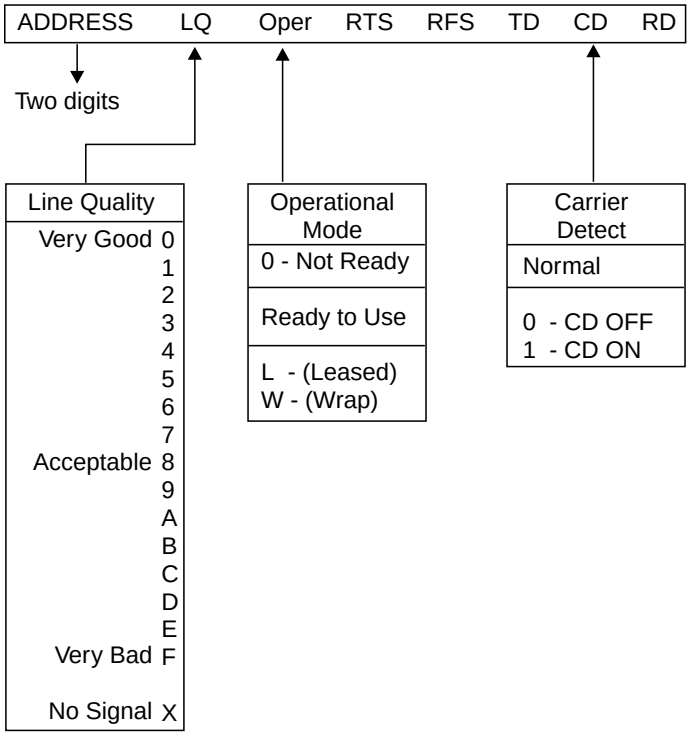


Figure 6-3. LIC 5 - PKD Background Status

LIC 6 Configuration Summary Display (Erase Key)

When the background status is displayed, you can obtain the local configuration summary by pressing **Erase** and holding it down. This summary is displayed while **Erase** is held down between 0.5 and 5 seconds. Figure 6-4 explains the meanings of the values displayed.

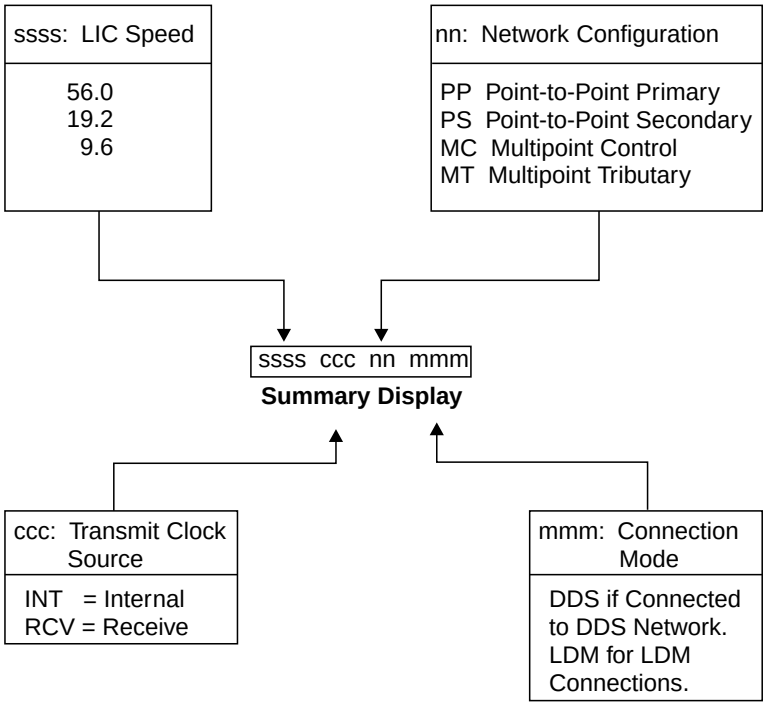


Figure 6-4. LIC 6 Configuration Summary

LIC 6 Background Status (Exit Key)

The background status is present on the PKD whenever there is no test activity. It provides a constant indication of the LIC status. Pressing **Exit** during a test procedure restores the background status.

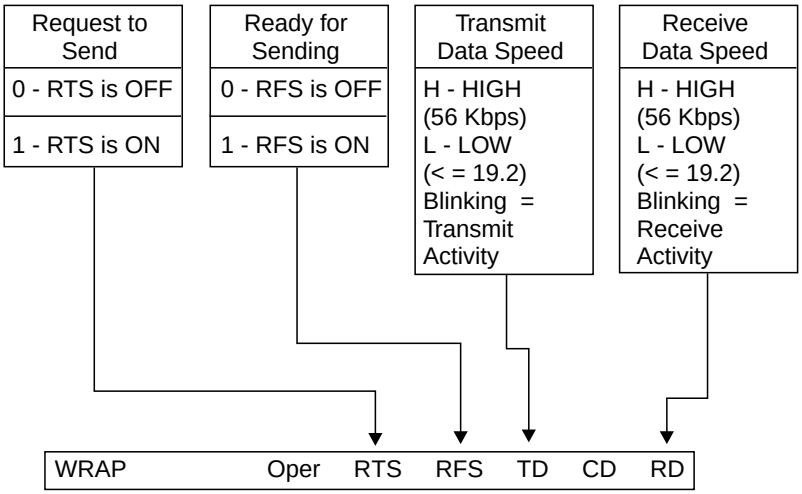


Figure 6-5. LIC 6 PKD Wrap Display

Figure 6-5 results from a “Manual Loopback Test (Key F)” on page 5-5

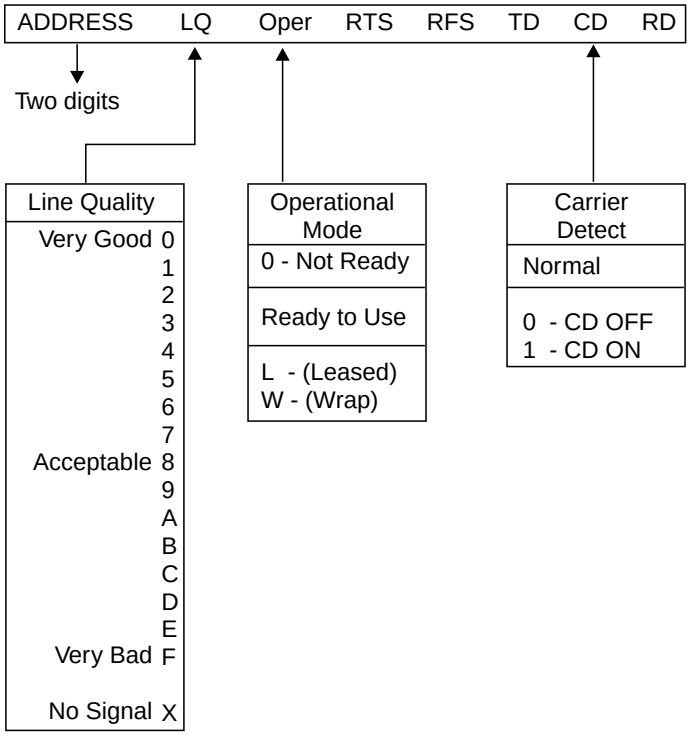


Figure 6-6. LIC 6 - PKD Background Status

Chapter 7. IBM 5869 PKD Description and Messages

The LIC 5 and the LIC 6 are equipped with a plug for connecting the IBM 5869 Portable Keypad Display (PKD).

The PKD is used to:

- Configure LIC 5 and LIC 6 parameters
- Perform operating procedures
- Test the LIC 5 and LIC 6
- Check modem status.

The PKD consists of a 20-key keypad and a 16-character display.

The PKD is hand-held and is powered from the 3745 when plugged into a LIC type 5 or 6. There are no batteries to change.

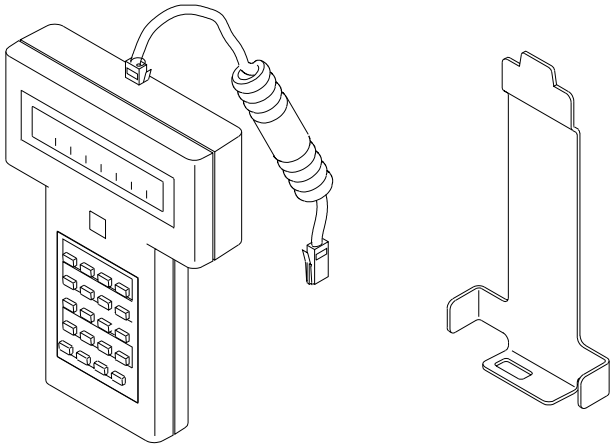


Figure 7-1. IBM 5869 Portable Keypad Display (and Support)

Using the PKD Support

If you intend to keep the PKD in its metal support (see Figure 7-1 above) when not in use, select a suitable position. For example, on the side of the cabinet. Make sure that the surface is smooth and free of dust.

Remove the backing strip from the self-adhesive tape on the metal support. Press the support strongly into position and hold in place for a few seconds. If you do not use the support, always store the PKD in a cool, dry place.

Plugging In the PKD

To plug in the PKD (see Figure 7-2 that follows):

1. Touch the ESD plate.
2. Hold the PKD plug with the lever upward.
3. Push the plug into the telephone modular jack on the front of the LIC until the lever clicks into place and the PKD display lights up. If the display does not light, refer to “Troubleshooting the PKD” on page 7-5.

Note: During operation, you can hang the PKD temporarily on the metal support that protrudes from the cover of the power supply. There is also a support inside each LIU 2. See the PKD support in Figure 7-1 on page 7-1.

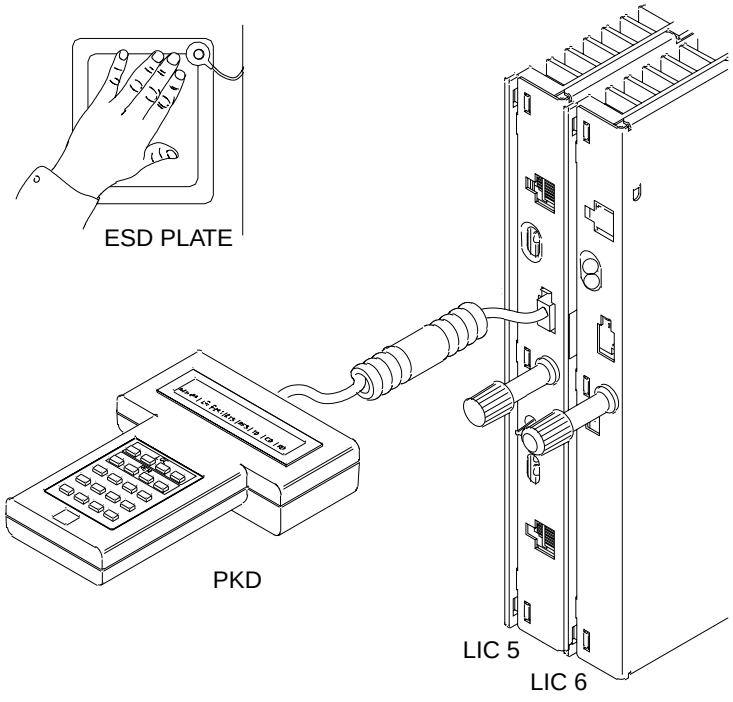


Figure 7-2. PKD Plugged In.

PKD Display

The PKD display is used to show information and messages. For example, when the PKD is plugged into a LIC for the first time, the display shows the LIC status.

When numeric input is expected, the display prompts you to enter the required number of digits.

PKD Keypad

The keypad has 20 keys and the key function is labeled above the key. Keys A to F and keys numbered 0 to 9 are also used to enter numeric or hexadecimal data whenever this is required.

If your PKD is not labeled in English, refer to Figure 7-3. This shows the position of the function keys that are referred to in this part. For example, the **Go** key is the bottom left key.

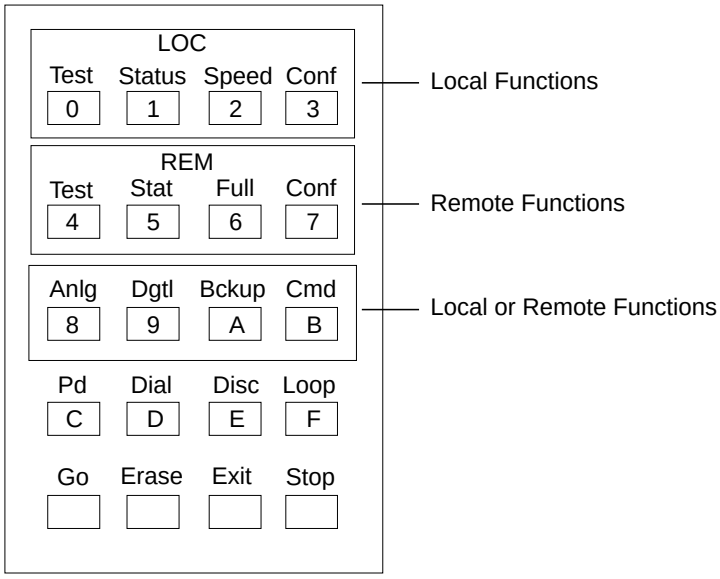


Figure 7-3. PKD Keypad

Keypad Functions

The following table lists all the keys and provides a brief description of the key functions. For more information, consult:

- Chapter 4, “LIC 5 Test Procedures”
- Chapter 5, “LIC 6 Test Procedures”
- Chapter 6, “LIC 5 and LIC 6 Operating Procedures.”

Key	Function	Function Description
0	Local test (LIC types 5 and 6)	An internal diagnostic is automatically performed first and can be followed by an operator selected wrap test. If the wrap test is selected, you must insert the telecommunication line wrap plug before pressing **Go**. The test continues until an error is met or until **Stop** or **Exit** is pressed.
1	Local status (LIC 5)	Causes the following information to be displayed: • Line quality, number of hits in the past 15 minutes, warnings logged, receive level. • Local DTE interface status and activity.
2	Speed change (LIC 5)	Allows you to switch the local LIC between the full and backup speeds.
3	Local configuration (LIC types 5 and 6)	Allows you to enter or read the local LIC configuration parameters.

Key	Function	Function Description
4	Remote test (LIC 5)	Selectable from a control or primary LIC. Causes a supervisory message to be sent to the remote modem, which runs the self-test once, then sends back a supervisory message with the result. For a control LIC, you must enter the remote modem address. For a primary LIC, no address is required.
5	Remote status (LIC 5)	Must be initiated with the address of the remote modem when required. Causes the following information to be displayed: • Remote line status, line quality, number of hits in the past 15 minutes, warnings logged, receive level. • Remote DTE interface status and transition since last request.
6	Remote full speed (LIC 5)	Selects the full speed of the addressed remote modem.
7	Remote configuration (LIC 5)	Allows you to enter or read the addressed remote modem configuration parameters.
8	Analog test (LIC 5)	Analyzes data-dependent and line-impairment parameters on an analog line between the local LIC and an addressed remote modem (also see specific remote modem documentation.)
9	Digital test (LIC types 5 and 6)	This test is possible with a multipoint control or point-to-point primary LIC. Blocks of test data are sent to the addressed remote modem, which returns the same data to the local LIC. Errors met in either the inbound or outbound direction are displayed at the local LIC.
A	Remote backup speed (LIC 5)	Selects the backup speed (for internal clocking modems) of the addressed remote modem.
B	Commands (LIC 5)	Allows the user to enter commands using a three-digit code: 100 Load default configuration. 555 Address a remote modem by its serial number (to configure a modem for the first time). This command can not be used for a remote LIC 5. 666 Long timer (10 minutes). 703, 704, 705 Remote contact sense/operate facilities in point-to-point or multipoint mode (by entering the remote address). 730 Tone Test (1004 Hz).
C	Problem determination (LIC types 5 and 6)	When there are communication line problems, this function causes a series of diagnostic tests to be run to determine if the problem is the local LIC, the remote modem, or the line. See the *Problem Determination Guide*, SA33-0096.
D		Not used by a LIC type 5 or 6.
E	Disconnect (LIC 5)	Allows you to disconnect a remote modem working in Switched Network Backup (SNBU) mode. The LIC 5 does not support an SNBU mode.
F	Manual loop-back (LIC types 5 and 6)	Loop types 2 and 3 can be inserted. For a loop 3, the local data terminal sends data to the modem and checks the data returned. For a loop 2, the command must be executed on the remote modem for the data to be sent back on the line. **Note:** LIC 5 can insert loops 2 and 3. LIC 6 can insert only loop 3.
Go		Used to validate a function or an input, such as a modem address or command code. Can also be used to perform a LIC lamp and PKD display test (by holding down the key for less than 5 seconds).

Key	Function	Function Description
Erase		Used to: • Scroll configuration values for each option • Correct data entered for an option • Select the self-test option • Obtain a configuration summary (by holding down the key for less than 5 seconds).
Exit		Ends a test, or ends a configuration data display and re-displays the background information. If held down for more than half a second, it causes the display to show the physical position of the LIC on the board. Also clears certain messages, when necessary.
Stop		Ends a test. Can also be used to perform a LIC lamp and PKD display test for LIC types 5 and 6 (by holding down the key for less than 5 seconds). For LIC 5 only, skips to next group of options in the configuration.

Troubleshooting the PKD

Step 1 Plug the PKD into a LIC. Look at the display:

1. If the LIC status is displayed (see page 6-18 or 6-20), the PKD is ready for use.
2. If another type of message is displayed, see “PKD Messages” on page 7-6.
3. If nothing is displayed, continue with the next step.

Step 2 Check that the PKD is correctly plugged in. If the problem persists, continue with the next step.

Step 3 Plug the PKD into another LIC of the same LIU to check which is failing: the LIC or PKD. If the PKD is OK, go to Step 5

If the problem persists, continue with the next step.

Step 4 Plug the PKD into a LIC in a different LIU known to be working. This is to check the power supply of the first LIU.

If the problem persists, the PKD is failing. Replace it.

If the PKD is OK, continue with next step.

Step 5 You may have a problem with the LIC or LIU. See the *Problem Determination Guide*, SA33-0096 for use of the PKD key C.

PKD Messages

This section lists, in alphabetical order, all of the messages that are displayed on the PKD for:

- Modem status
- Configuration
- Running a command or test.

It explains why a message is displayed, and how to respond to it.

Table 7-1 (Page 1 of 4). PKD Messages and Actions

PKD Display	Comments and Actions
xxxxx STUCK	The xxxxx key appears to have been pressed for more than 5 seconds. The message remains for 10 seconds. This is a mechanical or electrical problem.
	Action: 1. Use your finger to try to release the key. 2. If the problem persists, try disconnecting and connecting the plugs at each end of the PKD cable once or twice to clean the contacts. 3. If the problem still persists, replace the PKD.
BAD LINE SIGNAL	Line quality has been heavily degraded for more than 30 seconds and a self-test is in progress.
	Action: Press **EXIT**.
BAD RESPONSE	A remote LIC or modem has provided an invalid response.
	Action: Perform an automatic problem determination. See the *Problem Determination Guide*, SA33-0096.
BUSY TC ON	An analog loop via test control (TC) is in progress.
	Action: Wait. If the message remains, check if a test is being performed on the 3745. The length of time to wait depends on the test running.
CMD FROM LINE	An LPDA* command is in progress.
	Action: If background information is not displayed on the PKD within 30 seconds: • Check if a command is being issued by the host. • If there is no command, unplug and plug in the local LIC, and run the application again.
CMD FROM DTE	An LPDA command is in progress.
	Action: If background information is not displayed on the PKD within 30 seconds: • Check if a command is being issued by the 3745. • If there is no command, unplug and plug in the local LIC, and run the application again.
CONFIG FROM LINE	A configuration is being requested from a remote site.
	Action: Wait up to five minutes.

Table 7-1 (Page 2 of 4). PKD Messages and Actions	
PKD Display	**Comments and Actions**
CONFIG FROM HOST	A configuration is being requested from the host.
	Action: Wait up to five minutes.
CONFIG MISMATCH	The configuration of the attached remote modem is different from the local LIC 5.
	Action: Reconfigure either the local LIC 5 or the remote modem so that the two configurations match.
DDS _ LINE DOWN	Either there is no receiver timing or there is an error on received block (digital data service mode).
	Action: 1. Check that the line is correctly plugged into the LIC. 2. If the problem persists, perform an automatic problem determination. See the *Problem Determination Guide*,SA33-0096.
DDS OOS OOF	The network is not operational (out of service or out of frame).
	Action: • Call the network operator and ask if the network is operational. • If the network is operational, ask the remote operator to perform the remote LIC or modem self-test.
DEFAULT CONFIG	The configuration options have been set to their default values.
	Action: Reconfigure the LIC 6, if necessary.
LDM _ LINE DOWN	Either there is no receiver timing or there is an error on received block (LDM mode)
	Action: 1. Check that the line is correctly plugged into the LIC. 2. If the problem persists, perform an automatic problem determination. See the *Problem Determination Guide*, SA33-0096.
LOCAL ONLY	The remote configuration option (ITU-T or native) can not be changed from the local LIC.
	Action: Continue the configuration.
MAND DDS LOOP	Digital data service network test in progress.
	Action: Ask the telephone company or PTT why they are testing the line and how long will it take.
MASTER ONLY	The command or test can not be attempted from a tributary or secondary LIC or modem.
	Action: The test must be requested from a primary or control LIC. Press **Exit** to return to the background status.

Table 7-1 (Page 3 of 4). PKD Messages and Actions	
PKD Display	**Comments and Actions**
NO FEATURE	An SNBU command has been attempted from the local LIC. The SNBU mode is not supported.
	Action: Press **Exit** to return to the background display.
NO LINE SIGNAL	The carrier detect (CD) data set leads has been off for more than 30 seconds and a self-test is in progress.
	Action: Press **Exit**.
NO RESPONSE	The remote LIC or modem has not responded to a control LIC command. • The remote LIC or modem address entered from the control LIC is wrong. • If this message is displayed after the B555 command, the serial number of the remote LIC or modem should be checked.
	Action: • Check the address of the tributary remote LIC or modem and reenter it from the control LIC. • Ask the remote operator to check the serial number in the configuration. Press **Exit** to return to the background display.
NOT APPLICABLE	Self-explanatory.
	Action: None.
NOT EXECUTED	Self-explanatory.
	Action: None.
OPT DDS:LOOP	DDS test being performed, or faulty local LIC.
	Action: • Contact your telecommunication line service to confirm that a digital data service test is being performed and wait for it to be completed. • If no test is in process, unplug and plug in the LIC (to reset it). • If the message is still displayed, replace the LIC. • If the message is no longer displayed: – Plug in the LIC cable. – Run the application again.
READ ONLY	Self-explanatory.
	Action: None.
REM MODEM FAILED	The remote LIC or modem has failed.
	Action: Press **Exit**. Inform the remote LIC or modem operator about the problem.
REM PWR LOSS	The remote LIC or modem power supply has failed.
	Action: Press **Exit**. Inform the remote LIC or modem operator.

Table 7-1 (Page 4 of 4). PKD Messages and Actions	
PKD Display	**Comments and Actions**
SELECT DDS MODE	An invalid pattern received (for example, a digital data service pattern when in LDM mode).
	Action: 1. Check that the configuration option DDS or LDM is correct. 2. If the problem persists, perform an automatic problem determination. See the *Problem Determination Guide*, SA33-0096.
STREAM ON RTS	A time threshold has been exceeded.
	Action: Check the application running on the 3745.
TEST FROM HOST	A test has been initiated from the host at the request of the 3745.
	Action: Wait. If the message remains, ask the host network operator why the line is being tested and how long will it take.
WRONG SLOT	A LIC type 5 or 6 has been plugged into a wrong position. **Note:** Green and yellow lights will also flash.
	Action: Remove the LIC. Replace with a dummy LIC. Check the configuration.

Part 2. Migration and Planning

Chapter 8. Plugging Sheets for the LIC Types 5 and 6

Why Plugging Sheets and Cable Labels Are Required

Even for a small configuration, it is very important to identify cable(s). Use the plugging sheet examples given in this chapter and cable labels to prepare cable identification:

- **Plugging sheets** summarize the cable situation. These sheets will be used at installation time and must be updated at each cabling change. The plugging sheet set is the map of your cabling situation. Refer to "Preparing the Plugging Sheets."

  The plugging sheets must be filled in **before installation**.

  Update these sheets (and create new cable labels) when changing, removing, or adding LICs and cables during later modifications. They are necessary for problem determination, configuration modifications, and controller relocation.

- **Labels** identify both ends of each cable (3745 side and destination side).

  The labels are filled out by the customer engineer (CE) **at installation time** according to the information supplied by the customer on the plugging sheets.

  Update or **replace** the labels during later cable and 3745 coupler modifications. Refer to "Preparing the Cable Labels" on page 8-3.

Preparing the Plugging Sheets

Prepare your plugging sheets for the LIC types 5 or 6:

1. With copies of the blank plugging sheets provided in "Plugging Sheet" on page 8-4.

   There is an example plugging sheet for LIC types 5 and 6 in Figure 8-1 on page 8-2.

2. With the line characteristics provided in your installation sheets:

   - LIC type
   - Port number.

   For information about the installation sheets, refer to Chapter 11, "Familiarizing Yourself with the Installation Sheets"

3. With your network line characteristics:

   - Network type
   - Line reference
   - Destination.

4. Use the cable characteristics adapted to your installation.

   - Cable group or cable part number
   - Cable length.

5. If an IBM representative is not doing the installation or change, prepare the cable labels according to "Preparing the Cable Labels" on page 8-3.

3745 Communication Controller Name: CC1				Frame: 3746-L14 LIC Unit: 06D	
LIC Port	LIC Type	Network Type	Line Reference	Destination	Comments
0640	5	LDM	R370L40	Tech Support, Orlando	
0641					

Figure 8-1. Example Plugging Sheet for LIC Types 5 and 6

Legend:

3745 Communication Controller Name Your identification for the 3745 base frame (CC Name on the cable label).

Frame The frame where the LICs are located.

LIC Unit The LIC location within the frame.

LIC Port Address of the LIC as it appears on the HONE installation sheet.

LIC Type The LIC can be a type 5 or 6.

Network Type One of the following: analog, DSU/CSU, baseband, private, or limited distance modem (LDM).

Line Reference Either: common carrier or public switched telephone network.

Destination The destination of the line using the LIC.

Preparing the Cable Labels

To prepare the cable labels, proceed as follows:

1. Have the necessary number of cable labels required for your installation. Two labels are needed for each cable.
2. Enter the line characteristics given in your plugging sheets in the appropriate areas.
3. Attach an identical label to each end of each cable (3745 side and destination side).

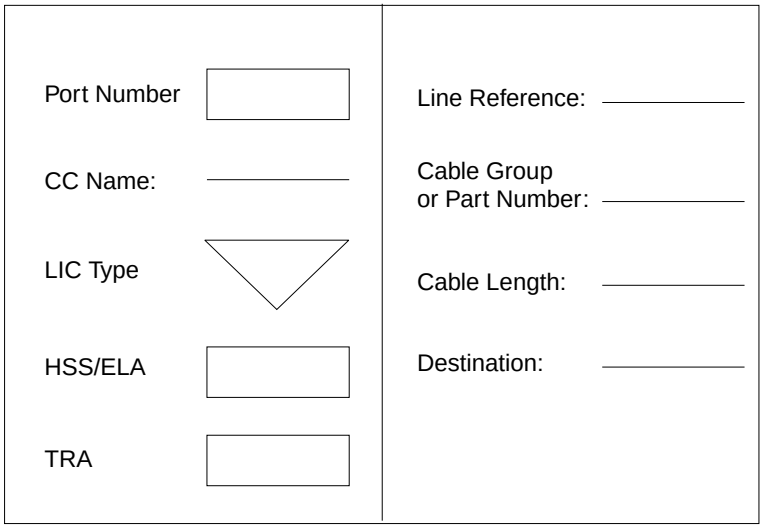


Figure 8-2. Cable Label Form

Plugging Sheet

3745 Communication Controller Name:

Frame:

LIC Unit:

LIC Port	LIC Type	Network Type	Line Reference	Destination	Comments

Chapter 9. Allocating Ports and Configuring LIC 5 and LIC 6

To allocate ports and configure the LIC types 5 and 6:

1. Fill in the allocation configuration sheet by selecting the ports you want to use, and allocating them to LIC types 5 or 6, according to the plugging sheets.

   The allocation sheet is provided in “Allocation and Configuration Sheets (LIC Types 5 and 6)” on page 9-6.

   Note: This sheet provides you with an overview of all the ports that are spare or allocated (and the LIC type they have been assigned). This shows the maximum ports available, if all expansion units are installed.

2. The range of port numbers is given at the top of the corresponding LIC types 5 or 6 configuration sheet. Complete the line of the relevant port number (that you have allocated) with the appropriate parameters for the LIC.

Selecting the Configuration Options for LIC 5

This chapter describes the group of LIC 5 configuration options.

Refer to the following explanations when filling in the LIC 5 configuration sheets provided in “Allocation and Configuration Sheets (LIC Types 5 and 6)” on page 9-6.

Refer to the remote modem documentation for an explanation of options available when configuring a remote modem from a LIC 5.

Note: When remotely configuring a LIC 5 from an IBM Modem 586X, the additional option "serial number" appears under the group of options MACH LEVEL. This option and the entered value are ignored by the remotely configured LIC 5.

Table 9-1 (Page 1 of 4). LIC 5 Configuration Options

Options	Values	Comments
ADDRESS	***xx***	Two-digit identification in the range 01 through FB.
TYPE	***14.4-12.0*** ***9.6-7.2*** ***4.8-2.4***	For the transmission speed of 14 400 bps. For the transmission speed of 9600 bps. For the transmission speed of 4800 bps. The same type must be defined for all the integrated modems in a given network, so that they can communicate with each other.
MODE Read only. **Set by the service representative.**	***ITU-T***	An integrated modem set in ITU-T mode is **not** compatible with an integrated modem in native mode, and does not allow full Link Problem Determination Aids (LPDA*) or remote test functions. The speeds and RFS delays should be set the same in both directions. The ITU-T mode allows point-to-point links at speeds up the maximum for each type selected (see TYPE).
	NATIVE	This is the recommended mode and allows all integrated modem functions: speed control, remote status, and LPDA.

Table 9-1 (Page 2 of 4). LIC 5 Configuration Options

Options	Values	Comments
PTP/MTP (Point-to-point or Multipoint)	***PTP***	Point-to-Point: There is only one remote location in your link. **PRIMARY**: The integrated modem is at the host site. A point-to-point primary integrated modem controls the speed and testing of the link and remote integrated modem. It can communicate with another point-to-point primary integrated modem or a secondary integrated modem. A primary-to-primary connection should be used when integrated modems transmit data between sites of equal importance and when speed control and testing can be initiated from either end. **SECONDARY**: The integrated modem is not at the host site. A point-to-point secondary integrated modem can not control the link speed or send test commands to the central (host site) integrated modem. **Note:** Configuring two integrated modems in a point-to-point network as secondary integrated modems is an invalid configuration and the integrated modems will not operate correctly.
	MTP	Multipoint: There are several remote integrated modems in your link. **CONTROL**: The modem is at the host site. A multipoint control integrated modem controls other integrated modems in your network. **TRIBUTARY**: The modem is not at the host site. The configuration for the tributary integrated modems can be defined from the multipoint control integrated modem.
XMIT CLOCK (Transmit Clock)	***INT***	Internal clock: The integrated modem uses the internal clock (normal mode).
	RCV	Receive clock: The local transmit clock is locked to the receive clock.
FAST MULTIPT (Fast Multipoint)	***NO or YES***	Available only if: MODE NATIVE, TYPE 14.4-12.0, and MTP TRIBUTARY.
9600 TCM (9600 bps Trellis Code Modulation)	***NO or YES***	Trellis code modulation provides better noise immunity under degraded line conditions. It is available only if: MODE NATIVE and TYPE 9.6-7.2.
PREEMPHASIS	***NO or YES***	Available only in ITU-T V.33 (TYPE 14.4-12.0). It allows improved performance on degraded lines.
RFS DELAY (Ready for Sending delay)	***LONG or SHORT***	Long or short training sequence, applicable on multipoint tributary integrated modems and all ITU-T V.29 integrated modems. Usually set to SHORT. Set to LONG if a telecommunication line problem is detected when operating with a particular integrated modem. This option is available only in MTP tributary.
ADD RFS DELAY (Additional Ready for Sending delay)	***nnn or ___***	Additional RFS delay may be needed when operating with a statistical multiplexer. This additional delay is available in both: • Continuous carrier (point-to-point) mode: In this mode, RFS follows RTS with the delay selected. • Switched carrier (multipoint) mode: In this mode, RFS follows RTS with the delay added to the short or long training sequences. It is expressed in milliseconds.

Table 9-1 (Page 3 of 4). LIC 5 Configuration Options

Options	Values	Comments
AUTO TEST	***NO or YES***	A local self-test is run automatically if no signal is received for 30 seconds. It is available only in PTP primary, PTP secondary, and MTP tributary.
ANTISTREAM (Antistreaming)	***NO or YES***	Prevents an integrated modem (on a multipoint link) from transmitting for more than its allocated time of: • 40 seconds at 2400 bps • 30 seconds at 4800 bps • 20 seconds at all other speeds.
L XMIT LEVEL (Transmit Level) Read only. **Set by the service representative.**	***-xx***	Number between 00 and 15 (negative) specifying (in dB) the transmitted signal power output when operating over a nonswitched line. This value must comply with the PTT requirements of the country in which the integrated modem is installed.
CD SENSIT (Carrier Detect Sensitivity) Read only. **Set by the service representative.**	***NORM or LOW***	• NORMAL sensitivity: received signal is detected down to -43 dB. • LOW sensitivity: received signal below -31 dB is not detected.
LPDA-2 (Link Problem Determination Aid Type 2)	***ENABLED or DISABLED***	Enabled if the host DTE supports LPDA-2.
QUAL THRES (Quality Threshold)	***nn or __***	Line quality (LQ) is defined on a scale of 00 to 15. The default (recommended) threshold value is 08. A line quality value of 00 indicates a very good line and a value of 15 indicates a very bad line. If a value of less than 08 is used, then line quality may be a contributing factor to an excessive error rate.
LEVEL THRES #- (Level Threshold)	***nn or __***	Specifies the receive level threshold. In the range 00 to 43 (negative). A warning indication is reported in the *LPDA-2 integrated modem and line status report* if the received signal is below the defined setting.
BACKUP SPEED	***7200 or 4800***	Used only in ITU-T V.29 mode to specify if the first or second backup speed (in bps) is used.

Table 9-1 (Page 4 of 4). LIC 5 Configuration Options		
Options	**Values**	**Comments**
DEFAULT SPEED	***9600 or 7200*** ***4800 or 2400*** ***14000 or 12000***	4800 or 2400 bps 9600 or 7200 bps 14 000 or 12 000 bps. The default speed is the speed assumed by the integrated modem at power ON. The permanent storage of the integrated modem records this speed. This is used by all integrated modems that have the speed control modem option (PTP PRIMARY, MTP CONTROL). It may be set to the backup speed, if it is planned to operate using the backup speed for an extended period of time. The remote integrated modem automatically follows the control integrated modem.
BUZZER CTL	***ON or OFF***	If ON, the buzzer is enabled.
MACH LEVEL (Machine Level) Read only.	***xxxxx***	This is the technical level of the integrated modem displayed in composite form. **Note:** When remotely configuring a LIC 5 from an IBM Modem 586X, the additional option *Serial Number* appears under this group of configuration options. The value entered by the 586X operator is purposely ignored from the remotely configured LIC 5 and will not affect its operation.

Selecting the Configuration Options for LIC 6

This chapter describes the group of LIC 6 configuration options.

Refer to the following explanations when filling in the LIC 6 configuration sheets provided in “Allocation and Configuration Sheets (LIC Types 5 and 6)” on page 9-6.

The LIC 6 configuration options can only be set locally.

Port Numbering

- A LIC 6 running in V.24 occupies two ports and is configured by the even port number.
- A LIC 6 running in V.35 occupies four ports and is configured by the first even port number.

Note: In the case of V.35, cross out the second even port number, to ensure that the second even port (of the four ports) is not inadvertently configured.

Table 9-2. LIC 6 Configuration Options

Options	Values	Comments
ADDRESS	***xx***	Two-digit identification in the range 01 through FB.
MODE	***DDS***	Digital data service: To be connected to digital data service network. In this case, you cannot select: INTERNAL CLOCK
	LDM	Limited distance modem: To be connected as a limited distance modem. In this case, you can not select: • MTP CONTROL • MTP TRIBUTARY
CLOCK	***INTERNAL CLOCK***	Internal clocking.
	NETWORK CLOCK	Network clocking: The local transmit is to be locked to the receive clock (to generate transmit clock-synchronous mode).
PTP/MTP (Point-to-point or Multipoint)	***PTP***	Point-to-Point: There is only one remote location in your link. **PRIMARY** If at the host end. **SECONDARY** If not at the host end.
	MTP	Multipoint: There are several remote locations in your link. Only in this case can the option MODE LDM be selected. **CONTROL** If at the host end. **TRIBUTARY** If not at the host end. Only in this case can the option ANTISTREAMING YES be selected.
SPEED	***56000*** ***19200*** ***9600***	56 000 bps (V.35) 19 200 bps (V.24) 9600 bps (V.24) Select speed as required. If you are using a digital data service (DDS), the data rate must match that of the DDS. **Note:** Switching between V.35 (56 000 bps) and V.24 (9600 or 19 200 bps) is done by using the line selector switch on the side of the LIC 6.
ANTISTREAM (Antistreaming)	***YES or NO***	If YES, each tributary in the link is prevented from transmitting for more than 10-20 seconds continuously: • 10 seconds at 56 000 bps • 20 seconds at 19 200 bps and 9600 bps In this case, you can not select: • PTP PRIMARY • PTP SECONDARY • MTP CONTROL
NETW SERVICE (Network services)	***ON or OFF***	When ON, network services (including LPDA-2) are performed. **Note:** For a LIC 6 connected to an IBM Modem 5821 (no LPDA-2 support), Network Services **must be OFF**.
BUZZER	***ENABLED or DISABLED***	Self explanatory.
MACH LEVEL (Machine level) Read only.	***xx***	This is the technical level of the integrated modem displayed in composite form.

Allocation and Configuration Sheets (LIC Types 5 and 6)

Controller Identification

Identification is essential when more than one controller is to be configured and installed in the same place. Label the configuration sheets with the:

- Controller name
- Frame
- LIC unit.

Three types of example configuration sheets are provided in this section:

1. Allocation configuration sheets
2. LIC 5 configuration sheets for up to 16 LICs
3. LIC 6 configuration sheets for up to 32 LICs.

Photocopy these example sheets as required.

3745 Allocation Configuration Sheet (LIC Types 5 and 6)

Controller Name: _____ ***Frame:*** _____ ***LIC Unit:*** _____

Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type	Port	LIC Type
0064		0128		0192		0256		0320		0384		0448		0512		0576		0640		0704		0768		0832	
0065		0129		0193		0257		0321		0385		0449		0513		0577		0641		0705		0769		0833	
0066		0130		0194		0258		0322		0386		0450		0514		0578		0642		0706		0770		0834	
0067		0131		0195		0259		0323		0387		0451		0515		0579		0643		0707		0771		0835	
0068		0132		0196		0260		0324		0388		0452		0516		0580		0644		0708		0772		0836	
0069		0133		0197		0261		0325		0389		0453		0517		0581		0645		0709		0773		0837	
0070		0134		0198		0262		0326		0390		0454		0518		0582		0646		0710		0774		0838	
0071		0135		0199		0263		0327		0391		0455		0519		0583		0647		0711		0775		0839	
0072		0136		0200		0264		0328		0392		0456		0520		0584		0648		0712		0776		0840	
0073		0137		0201		0265		0329		0393		0457		0521		0585		0649		0713		0777		0841	
0074		0138		0202		0266		0330		0394		0458		0522		0586		0650		0714		0778		0842	
0075		0139		0203		0267		0331		0395		0459		0523		0587		0651		0715		0779		0843	
0076		0140		0204		0268		0332		0396		0460		0524		0588		0652		0716		0780		0844	
0077		0141		0205		0269		0333		0397		0461		0525		0589		0653		0717		0781		0845	
0078		0142		0206		0270		0334		0398		0462		0526		0590		0654		0718		0782		0846	
0079		0143		0207		0271		0335		0399		0463		0527		0591		0655		0719		0783		0847	
0080		0144		0208		0272		0336		0400		0464		0528		0592		0656		0720		0784		0848	
0081		0145		0209		0273		0337		0401		0465		0529		0593		0657		0721		0785		0849	
0082		0146		0210		0274		0338		0402		0466		0530		0594		0658		0722		0786		0850	
0083		0147		0211		0275		0339		0403		0467		0531		0595		0659		0723		0787		0851	
0084		0148		0212		0276		0340		0404		0468		0532		0596		0660		0724		0788		0852	
0085		0149		0213		0277		0341		0405		0469		0533		0597		0661		0725		0789		0853	
0086		0150		0214		0278		0342		0406		0470		0534		0598		0662		0276		0790		0854	
0087		0151		0215		0279		0343		0407		0471		0535		0599		0663		0727		0791		0855	
0088		0152		0216		0280		0344		0408		0472		0536		0600		0664		0728		0792		0856	
0089		0153		0217		0281		0345		0409		0473		0537		0601		0665		0729		0793		0857	
0090		0154		0218		0282		0346		0410		0474		0538		0602		0666		0730		0794		0858	
0091		0155		0219		0283		0347		0411		0475		0539		0603		0667		0731		0795		0859	
0092		0156		0220		0284		0348		0412		0476		0540		0604		0668		0732		0796		0860	
0093		0157		0221		0285		0349		0413		0477		0541		0605		0669		0733		0797		0861	
0094		0158		0222		0286		0350		0414		0478		0542		0606		0670		0734		0798		0862	
0095		0159		0223		0287		0351		0415		0479		0543		0607		0671		0735		0799		0863	

3745 Configuration Sheet (LIC 5)

Controller Name: _____ ***Frame:*** _____ ***LIC Unit:*** _____

Port	ADDR.	TYPE	MODE	PTP/ MTP	XMIT CLOCK	FAST MULT	9600 TCM	PRE-EMPH	RFS DELAY	ADD RFS DELAY	AUTO TEST	ANTI STREAM	L XMIT LEVEL	CD SENSIT	LPDA-2	QUAL THRES	LEVEL THRES	BACKUP SPEED	DEFAULT SPEED	BUZZER CTL

3745 Configuration Sheet (LIC 6)

Controller Name: ______________________________ ***Frame:*** ______________ ***LIC Unit:*** ____________

Port	ADDRESS	MODE	CLOCK	PTP/MTP	SPEED	ANTISTREAM	NETW SERVICE	BUZZER

Chapter 10. LIC 5 and 6 Characteristics and Line Weights

This chapter provides the rules for calculating weights of the LIC 5 and 6 lines.

Characteristics of the LIC 5 and 6

Table 10-1 gives some characteristics of the LICs 5 and 6.

Table 10-1. LIC 5 and LIC 6 Characteristics

	LIC 5	**LIC 6**
Line Speed	4800, 9600, or 14 400 bps	See line attachments
Number of ports	2	2
Protocols	Synchronous (SDLC, BSC)	Synchronous (SDLC, BSC)
ITU-T Interface	X.24	X.24, V.35
Modem Mode	Native or ITU-T	Native
Line Attachments	Non-switched, 4-wire telecommunication line that is either: • Unconditioned for U.S.A. and Canada • Conditioned to ITU-T M.1020 or M.1025 for other countries	Either to a • Digital data service (DDS) network (U.S.A. and Canada) Line speed: 9.6 or 56 kbps • Unconditioned, non-switched, limited distance line Line speed: 9.6, 19.2, or 56 kbps

Line Weight Calculation

The line weight is the percentage of the low-speed scanner capacity that the line uses. For example, five lines each with a weight of 20 take up 100% of the capacity of a low-speed scanner. Spare (unused) lines have a weight of zero.

The line weight is given by the following formula:

Weight = Line Speed / C
"C" is a coefficient related to the line protocol.

The values of the coefficient "C" are given in Table 10-2 for LICs 5 and 6.

Table 10-2. Line Weight Calculation for LIC Types 5 and 6

Line Protocol	**LIC 5 (Up to 4 LICs per LSS)**	**LIC 5 (More than 4 LICs per LSS)**	**LIC 6**
SDLC Duplex	1920	1536	2560
SDLC Half-Duplex	3456	3072	4052
BSC EBCDIC under NCP	3456	3072	4052
BSC under EP	3456	3072	4052
BSC ASCII under NCP	2420	2016	3041

Scanner Capacity

The maximum number of LIC positions supported per low-speed scanner depends on the line with the highest transmission speed connected to the scanner, and is limited by the LIC enclosure capacity.

For LIC 5 Pairs

LIC 5s are treated as odd/even card location pairs for calculating scanner capacity.

You can calculate the scanner capacity according to the formula:

$$\frac{307\,200}{4 \times \text{Maximum Speed}} = \text{Number of LIC 5 Odd/Even Pairs}$$

The results are given in Table 10-3:

Table 10-3. Two-Port LICs - LIC 5

Maximum Line Speed	Maximum Number of Two-Port LIC Pairs
14 400	5
9 600	8
4 800	8

For LIC 6

LIC 6s are treated as odd/even card location pairs for calculating scanner capacity if the speed set is not greater than 19 200 bps. If the LIC 6 speed is 56 000 bps, only one LIC6 can be installed in an odd/even card location pair, so they are treated as individual LIC 6s for calculating scanner capacity.

You can calculate the scanner capacity according to the formula:

$$\frac{307\,200}{4 \times \text{Maximum Speed}} \text{ at 9600 or 19 200 bps} = \text{Number of LIC 6 Odd/Even Pairs}$$

or

$$\frac{307\,200}{\text{Maximum Speed}} \text{ at 56 000 bps} = \text{Number of LIC 6}$$

The results are given in Table 10-4:

Table 10-4. One-Port LICs - LIC 6

Maximum Line Speed	Maximum Number of One-Port LICs or Pairs
56 000	5 LICs
19 200	4 LIC Pairs
9 600	8 LIC Pairs

Mixing Line Interface Couplers

To calculate the capacity of a low-speed scanner (LSS) connecting LICs with one or two ports, the following rules apply:

1. One-port LICs : LIC type 6.
2. Two-port LICs : LIC type 5.

Mixing One-Port and Two-Port LICs

If one-port LICs are mixed with two-port LICs on the same scanner, you should consider:

- The permissible number of one-port LICs or LIC pairs with the highest speed.
- The permissible number of two-port LICs or LIC pairs with the highest speed.

Then, compare the two numbers and use the lower number.

Spare Lines

Spare (unused) lines have a weight of zero.

Selective Scanning

For more details on selective scanning, refer to the *Introduction*, GA33-0092 (for Models 210 to 610) or *Introduction*, GA33-0138 (for Models 130 to 170). This information also applies to the Models A.

Unlike LICs in earlier communication controllers, 3745 LICs are only scanned if at least one of the lines connected to them is activated. LICs with inactive lines do not contribute to the scanner load.

Note: A LIC leaves the scan ring only after all the active lines on the LIC are deactivated by a Disable command from the control program.

Chapter 11. Familiarizing Yourself with the Installation Sheets

The cabling plan depends on your configuration.

The configuration of your 3745 is given mainly on the **installation sheets** of the HONE Configurator (CF3745) report. See your IBM representative to obtain this report. There is one or more installation sheets for each machine.

The examples in this chapter may not match exactly the format of your HONE installation sheets. The CF3745 may have changed its output since this chapter was written. It is only meant to serve as a guide to help you understand your installation sheets. More details can be found in the *Migration and Planning Guide*, GA33-0183.

Installation Sheets (3745 and 3746 L13 to L15)

This section provides an example of the HONE installation sheets.

In this example, the LIC types 5 and 6 lines are attached to a 3745 Model 21A (base frame).

The example consists of:

1. “Example of Cross System Links and Line Group Information” on page 11-2.
2. “Example of the Cables for the 3745 (LIC Types 1 to 6)” on page 11-3.

In this example, note that:

1. The format of your own installation sheet(s) may be different from this example. However, they will contain the same items with the same meanings.
2. Figures such as weight values do not correspond to a real configuration.

Example of Cross System Links and Line Group Information

Table 11-1. Cross System Links and Line Group Table Example

ID	Group Name	NB Lines	Line Speed	LIC Type	Protocol	Transmit Set	Line Weight	WT 4 LICs	Attach	Back up
1	Line Group 1	16	9600	1	SDLC HDX	EBCDIC	3.1	2.8	Modem	N
2	Line Group 2	5	56000	3	SDLC HDX	EBCDIC	21.9	21.9	Direct	N
3	Line Group 3	6	19200	1	SDLC HDX	EBCDIC	12.5	10.0	Modem	N
4	DDS/BB - 1	8	9600	6	SDLC HDX	EBCDIC	3.8	3.8	4 Wires	N
5	DDS/BB - 2	2	56000	6	SDLC HDX	EBCDIC	21.9	21.9	4 Wires	N
6	Analog	5	14400	5	SDLC HDX	EBCDIC	9.4	7.5	4 Wires	N

Legend:

ID The identification number (from 1 through 99) defined in the input to the CF3745 for a group of lines that are identical in all respects.

Group Name The name of the group used in the input to the CF3745.

Nb Lines The number of lines in this group.

Line Speed The speed of all lines in this group. It is given in bits per second (bps).

LIC Type The type of LIC used in this group. The LIC type can be 1, 3, 4A, 4B, 5, or 6.

Protocol The line control for this group. It can be S/S, BSC, or SDLC, and FDX (full duplex) or HDX (half duplex) transmission for this group.

Transmit Set The transmission code for this group. It can be EBCDIC or ASCII.

Line Weight The normal line weight for each individual line in this group.

WT 4 LICs The line weight for each individual line in this group (if the number of LICs being serviced by an individual low- or medium-speed scanner is less than or equal to 4).

Attach 4 wires for the telephone cable attached to LIC type 5 or 6.

Back Up **N** means that the line group is not a backup and is normally active when the controller is running.
Y means that the line group is a backup and is normally not active when the controller is running.

Example of the Cables for the 3745 (LIC Types 1 to 6)

Table 11-2. 3745 Cable Example Table

Cable Group	Quantity	Interface	Port Number
1604	22	LIC type 1 - external modem	0-11, 32-41
1605	5	LIC type 3 - direct attach	12, 16, 20, 24, 28
N/A	8	LIC type 6 - 4-wire cable	78, 80, 82, 84, 86, 88, 90,92
N/A	2	LIC type 6 - 4-wire cable	64, 68
N/A	5	LIC type 5 - 4-wire cable	72 - 76

Legend

Cable Group Each LIC 5 has two 15-meter cables and each LIC 6 has one 15-meter cable.

Qty Quantity of ordered cables in the same cable group.

Interface Type of attachment for the cables in the same cable group.

Port No. Numbers of the ports to which the cables of each cable group are connected.

LIU Identification for Models 210 to 61A

To identify the location for each LIC 5 and 6 to be installed, check that an identification is already given at the beginning of your HONE report. If yes, add this identification on the top of each installation sheet. Otherwise, it is recommended to add an identification. It is normally the physical unit name.

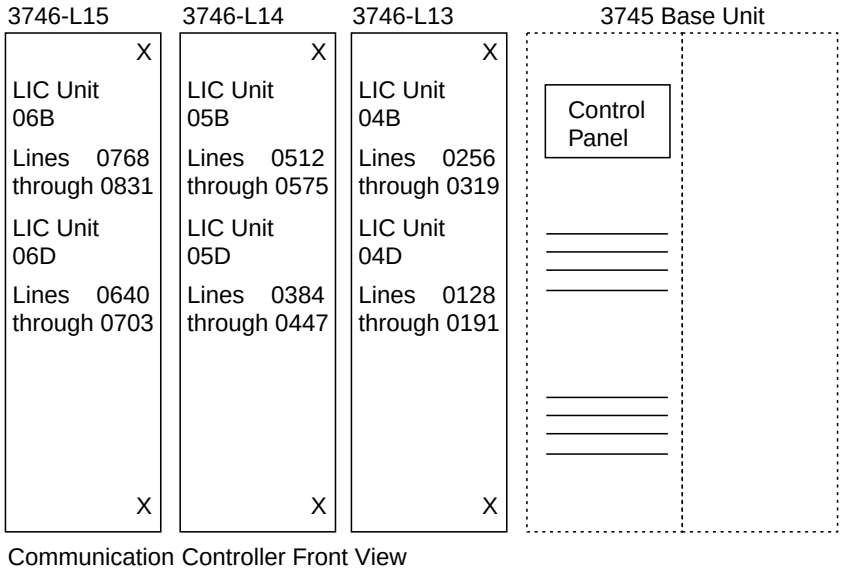


Figure 11-1. 3745 Models 210 to 61A Front View LIC Unit Locations

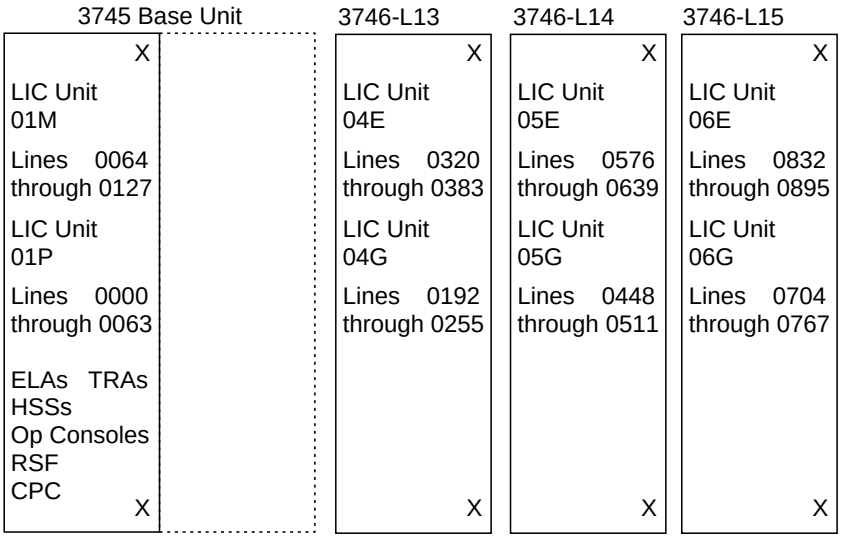


Figure 11-2. 3745 Models 210 to 61A Rear View LIC Unit Locations

LIB Identification for Models 130 to 17A

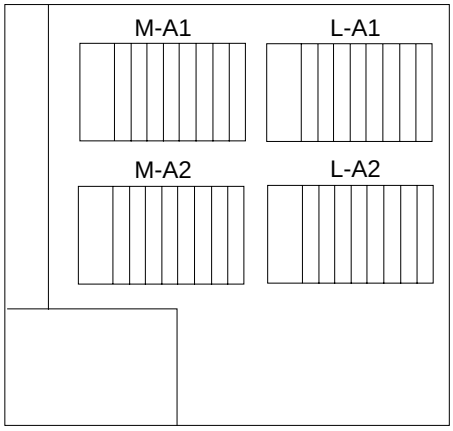


Figure 11-3. 3745 Models 130 to 17A LIC Base Locations

Notes:

1. Boards M-A1 and M-A2 are type 1 LIBs and are equipped with LIC types 1 to 4.
2. Board L-A1 is a LIB type 2 and is equipped with LIC types 5 and 6.
3. Board L-A2 can be a LIB type 1 or a LIB type 2.

Abbreviations, Glossary, Bibliography, and Index

List of Abbreviations

ACF	advanced communications functions
BSC	binary synchronous communication
CCITT	Comité Consultatif International Télégraphique et Téléphonique. The International Telegraph and Telephone Consultative Committee (now ITU-T)
CCU	central control unit
CDF	configuration data file
CSU	channel service unit
dB	decibel
DCE	data circuit-terminating equipment
DDS	digital data service
DSU	data service unit
DTE	data terminal equipment
DTR	data terminal ready
EIA	Electronics Industries Association
ELA	Ethernet LAN adapter
EP	emulation program
ESD	electrostatic discharge
FCC	federal communications commission
HSS	high-speed scanner
ITU-T	International Telecommunication Union - Telecommunication (formerly CCITT)
LDM	limited-distance modem
LIB	line interface base
LIC	line interface coupler
LIU	line interface coupler unit
LPDA	Link Problem Determination Aid
LQ	line quality
LSS	low-speed scanner
MOSS	maintenance and operator subsystem
NCP	network control program
PKD	portable keypad display
RFS	ready for sending
RTS	request to send
SDLC	synchronous data link control
SNBU	switched network backup
TRA	token-ring adapter
URL	uniform resource locator

Glossary

This glossary defines new terms used in this manual. It also includes terms and definitions from the *IBM Dictionary of Computing,* SC20-1699.

Advanced Communication Function (ACF). A group of IBM licensed programs. principally VTAM* programs. TCAM, NCP, and SSP, that use the concepts of Systems Network Architecture (SNA), including distribution of function and resource sharing.

asynchronous transmission. Data transmission in which transmission of a character or a block of characters can begin at any time but in which the bits that represent the character or block have equal time duration. Contrast with *synchronous transmission*.

binary synchronous transmission (BSC). A form of telecommunication line control that uses a standard set of transmission control character sequences, for binary synchronous transmission of binary-coded data between stations. Contrast with SDLC.

central control unit (CCU). In the 3745, the controller hardware unit that contains the circuits and data flow paths needed to execute instructions and to control its storage and the attached adapters.

channel service unit (CSU). An American Telephone and Telegraph (AT&T) unit that is part of the AT&T nonswitched digital data system.

communication common carrier. In the U.S.A. and Canada, a public data transmission service that provides the public with transmission service facilities. For example, a telephone or telegraph company (see also *Post, Telephone and Telegraph* for countries outside the U.S.A. and Canada).

communication controller. A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program executed in a processor to which the controller is connected or it may be controlled by a program executed within the device. Examples are the IBM 3705, IBM 3725/3726, IBM 3720, and IBM 3745 models 130, 150, 170, 210, 310, 410, and 610.

configuration data file (CDF). A 3745 MOSS file that contains a description of all the hardware features (presence, type, address, and characteristics).

control program. A computer program designed to schedule and to supervise the execution of programs of the controller.

control subsystem. The part of the controller that stores and executes the control program, and monitors the data transfers over the channel and transmission interfaces.

customer engineer. See IBM service representative

data circuit-terminating equipment (DCE). The equipment installed at the user's premises that provides all the functions required to establish, maintain, and terminate a connection, and the signal conversion between the data terminal equipment (DTE) and the line. For example, a modem is a DCE.

Note: The DCE may be a stand-alone equipment or integrated in the 3745.

data terminal equipment (DTE). That part of a data station that serves as a data source, data link, or both, and provides for the data communication control function according to protocols. For example, the 3745 can be a DTE.

data service unit (DSU). A device that provides a digital data service interface directly to the data terminal equipment. The DSU provides loop equalization, remote and local testing capabilities, and a standard EIA/CCITT interface.

data terminal ready (DTR). A signal to the modem used with the EIA-232 protocol.

direct attachment. The attachment of a DTE to another DTE without a DCE.

electronics industries association (EIA). An organization of electronics manufacturers that advances the technological growth of the industry, represents the views of its members, and develops industry standards.

electrostatic discharge (ESD). An undesirable discharge of static electricity that can damage equipment and degrade electrical circuitry.

emulation program (EP). An IBM control program that allows a channel-attached 3705 or 3725 communication controller to emulate the functions of an IBM 270x device. See also NCP.

Ethernet LAN adapter (ELA). Line adapter for Ethernet-type network, composed of one communication scanner processor card (CSP), and one Ethernet adapter card (EAC).

high-speed scanner (HSS). Line adapter for lines speeds up to 2 mbps. It is composed of a communication scanner processor (CSP) and a front-end high-speed scanner (FESH).

host processor. (1) A processor that controls all or part of a user application network. (2) In a network, the processing unit in which the access method for the network resides. (3) In an SNA network, the processing unit that contains a system services control point (SSCP). (4) A processing unit that executes the access method for attached communication controllers. Also called *host*.

IBM service representative. An individual in IBM who does maintenance services for IBM products or systems.

internal clock function (ICF). A LIC function that provides a transmit clock for sending data, and retrieves a receive clock from received data, when DCEs or direct-attached terminal do not provide those timing signals.

International Telecommunication Union - Telecommunication (ITU-T). The specialized telecommunication agency of the United Nations, established to provide standardized communication procedures and practices, including frequency allocation and radio regulations worldwide. (Formerly CCITT).

LIC unit (LIU). A line interface coupler unit consisting of:

- One power supply (PS) associated with
- Two line interface bases (LIBs), housing
- Multiplex cards, and
- Line interface coupler cards (LICs)

line. See *transmission line*.

line interface base (LIB). A board which houses:

- One multiplexer
- Up to eight LICs

line interface coupler (LIC). A circuit that attaches up to four transmission cables to the controller (from DTEs, DCEs or telecommunication lines).

Link Problem Determination Aid (LPDA). A series of test commands executed by an IBM DCE to determine which of various network components may be causing an error in the network.

low-speed scanner (LSS). Line adapter for lines up to 256 kbps. It is composed of a communication scanner processor (CSP) and a front-end low-speed scanner (FELS).

maintenance and operator subsystem (MOSS). The part of the 3745 that provides operating and servicing facilities to the user and IBM service representative.

modem (modulator-demodulator). See DCE.

multipoint connection. A connection established among more than two data stations for data transmission. The connection may include switching facilities.

native mode. An IBM modulation scheme.

Network Control Program (NCP). An IBM licensed program that provides communication controller support for single-domain, multiple domain, and interconnected network capability.

nonswitched line. A connection between systems or devices that does not have to be made by dialing. The connection can be point-to-point or multipoint. The line can be leased or private. Contrast with *switched line.*

point-to-point connection. A connection established between two data stations for data transmission. The connection may include switching facilities.

Post Telephone and Telegraph (PTT). A generic term for the government-operated common carriers in countries other than the U.S.A. and Canada. Examples of the PTT are British Telecom in the United Kingdom, the Deutsche Bundespost in Germany, and the Nippon Telephone and Telegraph Public Corporation in Japan.

secondary modem. A secondary device on a multipoint line.

service processor. The operator console for the Models 21A, 31A, 41A, and 61A, which is attached to the 3745 and 3746-900 via a token-ring LAN. It runs continuously transferring code to and from the processors inside the controller.

service representative. See IBM service representative

services. A set of functions designed to simplify the maintenance of a device or system.

switched line. A transmission line with which the connections are established by dialing, only when data transmission is needed. The connection is point-to-point and uses a different transmission line each time it is established. Contrast with *nonswitched line*.

switched network backup (SNBU). An optical facility that allows a user to specify, for certain types of physical units, a switched line to be used as an alternate path it the primary line becomes unavailable or unusable.

Synchronous Data Link Control (SDLC). A discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. SDLC conforms to subsets of the Advanced Data Communication Control Procedures of the American National Standards Institute and High-Level Data Link Control (HDLC) of the International Standards Organization.

synchronous transmission. Data transmission in which the sending and receiving instruments are operating continuously at substantially the same frequency and are maintained, through correction, in a desired phase relationship. Contrast with *asynchronous transmission*.

telecommunication line. Any physical medium, such as a wire or microwave beam, that is used to transmit data.

time out. A time interval allotted for certain operations to occur.

token-ring adapter (TRA). Line adapter for IBM Token-Ring Network, composed of one token-ring multiplexor card (TRM), and two token-ring interface couplers (TICs).

transmission line. The physical means for connecting two or more DTEs (via DCEs). It can be nonswitched or switched. Also called a *line*.

tributary modem. On a multipoint connection or a point-to-point connection using basic mode link control, any modem other than the control modem. See also secondary modem.

user application network. A configuration of data processing products, such as processors, controllers, and terminals, for data processing and information exchange. This configuration may use circuit-switched, packet-switched, and leased-circuit services provided by carriers or PTT. Also called a *user network*.

V.24, V.25, V.25bis, V.35. ITU-T recommendations on telecommunication physical interfaces.

X.20bis, X.21, X.21bis, X.24. ITU-T recommendations on network access protocols and interfaces.

Bibliography

Customer Documentation for the IBM 3745 (Models 210, 310, 410, 610, 21A, 31A, 41A, and 61A), and 3746 (Model 900)

Table X-1 (Page 1 of 4). Customer Documentation for the 3745 Models x10 and x1A, and 3746 Model 900

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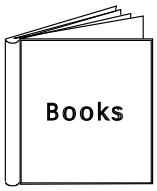
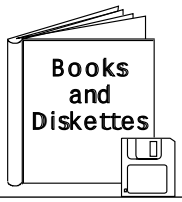




Finding Information

3745 Models A and 3746 Books

Starting with engineering change (EC) F12380, all of the books in the 3745 Models A and 3746 library are available on the CD-ROM that contains the Licensed Internal Code (LIC) for this EC.

SA33-0172

IBM 3745 Communication Controller
Models 210 to 61A
IBM 3746 Expansion Unit Model 900

Customer Master Index[1]

Provides references for finding information in the customer documentation library.

Evaluating and Configuring

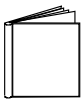
GA33-0092

IBM 3745 Communication Controller
Models 210, 310, 410, and 610

Introduction

Gives an introduction about the IBM Models 210 to 610 capabilities.

For Models A refer to the *Overview*, GA33-0180.



GA33-0180

IBM 3745 Communication Controller Models A[2]
IBM 3746 Nways Multiprotocol Controller
Models 900 and 950

Overview

Gives an overview of connectivity capabilities within SNA, APPN, and IP networking.

Table X-1 (Page 2 of 4). Customer Documentation for the 3745 Models x10 and x1A, and 3746 Model 900

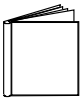
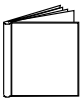
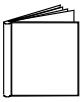
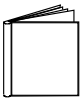
	GA33-0457	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Expansion Unit Model 900*** ***Models 900 and 950*** ***Planning Guide*** Planning for: • Field upgrades • Service processor and alert management configuration • Network integration (NCP, APPN, and IP control) • Physical installation.
Preparing Your Site		
	GC22-7064	***IBM System/360, System/370, 4300 Processor*** ***Input/Output Equipment Installation Manual-Physical Planning*** (Including Technical News Letter GN22-5490) Provides information for physical installation of the 3745 Models 130 to 610. For 3745 Models A and 3746 Model 900, refer to the *Planning Guide*, GA33-0457.
	GA33-0127	***IBM 3745 Communication Controller*** ***Models 210, 310, 410, and 610*** ***Preparing for Connection*** Helps for preparing the 3745 Models 210 to 610 cable installation. For 3745 Models A refer to the *Connection and Integration Guide*, SA33-0129.
Preparing for Operation		
	GA33-0400	***IBM 3745 Communication Controller All Models***[3] ***IBM 3746 Nways Multiprotocol Controller*** ***Models 900 and 950*** ***Safety Information***[1] Provides general safety guidelines.
	SA33-0129	***IBM 3745 Communication Controller All Models***[3] ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Connection and Integration Guide***[1] Contains information for connecting hardware and integrating network of the 3745 and 3746-900 after installation.
	SA33-0416	***Line Interface Coupler Type 5 and Type 6*** ***Portable Keypad Display*** ***Migration and Integration Guide*** Contains information for moving and testing LIC types 5 and 6.

Table X-1 (Page 3 of 4). Customer Documentation for the 3745 Models x10 and x1A, and 3746 Model 900

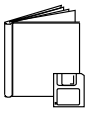
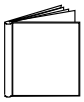
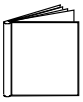
	SA33-0158	***IBM 3745 Communication Controller All Models***[3] ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Console Setup Guide***[1] Provides information for: • Installing local, alternate, or remote consoles for 3745 Models 130 to 610 • Configuring user workstations to remotely control the service processor for 3745 Models A and 3746 Model 900 using: – DCAF program – Telnet Client program.
Customizing Your Control Program		
	SA33-0178	***Guide to Timed IPL and Rename Load Module*** Provides VTAM procedures for: • Scheduling an automatic reload of the 3745 • Getting 3745 load module changes transparent to the operations staff.
Operating and Testing		
	SA33-0098	***IBM 3745 Communication Controller All Models***[4] ***Basic Operations Guide***[1] Provides instructions for daily routine operations on the 3745 Models 130 to 610.
	SA33-0177	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Nways Multiprotocol Controller Model 900*** ***Basic Operations Guide***[1] Provides instructions for daily routine operations on the 3745 Models 17A to 61A, and 3746 Model 900 operating as an SNA node (using NCP), APPN/HPR Network Node, and IP Router.
	SA33-0097	***IBM 3745 Communication Controller All Models***[3] ***Advanced Operations Guide***[1] Provides instructions for advanced operations and testing, using the 3745 MOSS console.
	On-line Information	***Controller Configuration and Management Application*** Provides a graphical user interface for configuring and managing a 3746 APPN/HPR Network Node and IP Router, and its resources. Is also available as a stand-alone application, using an OS/2 workstation. Defines and explains all the 3746 network node and IP configuration parameters through its on-line help.

Table X-1 (Page 4 of 4). Customer Documentation for the 3745 Models x10 and x1A, and 3746 Model 900

	SH11-3081	***IBM 3746 Nways Multiprotocol Controller Models 900 and 950*** ***Controller Configuration and Management: User's Guide***[5] Explains how to use CCM and gives examples of the configuration process.
Managing Problems		
	SA33-0096	***IBM 3745 Communication Controller All Models***[3] ***Problem Determination Guide***[1] A guide to perform problem determination on the 3745 Models 130 to 61A.
	On-line Information	***Problem Analysis Guide*** An on-line guide to analyze alarms, events, and control panel codes on: • IBM 3745 Communication Controller Models A[2] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.
	SA33-0175	***IBM 3745 Communication Controller Models A***[2] ***IBM 3746 Expansion Unit Model 900*** ***IBM 3746 Nways Multiprotocol Controller Model 950*** ***Alert Reference Guide*** Provides information about events or errors reported by alerts for: • IBM 3745 Communication Controller Models A[2] • IBM 3746 Nways Multiprotocol Controller Models 900 and 950.

[1] Documentation shipped with the 3745.
[2] 3745 Models 17A to 61A.
[3] 3745 Models 130 to 61A.
[4] Except 3745 Models A.
[5] Documentation shipped with the 3746-900.

Additional Customer Documentation for the IBM 3745 Models 130, 150, 160, 170, and 17A

Table X-2. Additional Customer Documentation for the 3745 Models 1x0 and 17A

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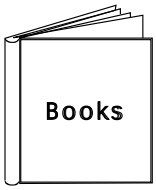
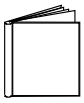


Finding Information



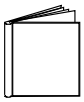
SA33-0142

IBM 3745 Communication Controller
Models 130, 150, 160, 170, and 17A
IBM 3746 Expansion Unit Model 900

Customer Master Index[1]

Provides references for finding information in the customer documentation library.

Evaluating and Configuring



GA33-0138

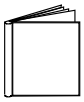
IBM 3745 Communication Controller
Models 130, 150, and 170

Introduction

Gives an introduction about the IBM Models 130 to 170 capabilities, including Model 160.

For Model 17A refer to the *Overview*, GA33-0180.

Preparing Your Site



GA33-0140

IBM 3745 Communication Controller
Models 130, 150, 160, and 170

Preparing for Connection

Helps for preparing the 3745 Models 130 to 170 cable installation.

For 3745 Model 17A refer to the *Connection and Integration Guide*, SA33-0129.

[1] Documentation shipped with the 3745.

Index

M

P

S

T

U

Readers' Comments — We'd Like to Hear from You

Line Interface Coupler Type 5 and Type 6
Portable Keypad Display
Migration and Integration Guide

Publication No. SA33-0416-00

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